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NYASALAND PROTECTORATE.

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ANNUAL
MEDICAL & SANITARY
REPORT

For the year ending 31st December, 1937.

NYASALAND PROTECTORATE.

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1938:
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MEDICAL DEPARTMENT,
ZOMBA,
NYASALAND.

22nd February, 1938.

SIR,

I have the honour to submit for the information of His Excellency the Governor and for transmission to the Right Honourable the Secretary of State for the Colonies, the Medical Report on the Health and Sanitary Conditions of Nyasaland for the year 1937, together with the Returns. etc., appended thereto.

I have the honour to be,
Sir,
Your obedient servant,
A. D. J. BEDWARD WILLIAMS,
Director of Medical Services.

The Hon. The Chief Secretary to the Government,
Zomba.

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MAP.

A Map of the Protectorate showing distribution of hospitals and dispensaries, the shaded areas indicating the distribution of tsetse fly.

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SECTION I. ADMINISTRATION.

(A) STAFF.

The staff sanctioned for the year 1937 was :—

(a) European.

Director of Medical Services.
Senior Health Officer.
Senior Medical Officer.
Medical Entomologist.
14 Medical Officers.
Pathologist.
Matron.
10 Nursing Sisters.
2 Sanitary Superintendents.
Office Superintendent and Medical Storekeeper.
Junior Clerk.

(b) Asiatic.

9 Sub Assistant Surgeons.

(c) African.

12 Clerks.
1 Laboratory Assistant.
11 Hospital Assistants, 1st Grade.
5 Hospital Assistants, Junior Grade.
19 Sanitary Inspectors.
36 Vaccinators.

A varying number of Dispensers, Hospital and Dispensary attendants, Native Nurses and Sanitary Labourers. The average numbers employed during the year were: Dispensers 201, Hospital and Dispensary Servants 270, Native Nurses 34, with a varying number of Sanitary Labourers.

Appointments.

(a) European.

	Date.
Miss C. Pritchard, Nursing Sister, (temporary)	29-3-1937
Miss M. Arnot, Nursing Sister	15-10-1937
Mr. E. H. Croghan, Sanitary Superintendent (temporary)	5-4-1937

(b) Asiatic.

Mr. P. D. Jhala, Civil Sub Assistant Surgeon (temporary)	1-9-1937

(c) African.

Mr. Kenan W. Mkandawire, Hospital Assistant, Junior Grade	1-8-1937
Mr. Alifeyu T. M. Mkisi, Hospital Assistant, Junior Grade	11-8-1937

Promotions.

Dr. T. A. Austin, Medical Officer, to be Senior Medical Officer, Tanganyika Territory. (Transfer pending.)

Miss N. M. Cremen, M.B.E., Nursing Sister to be Matron with effect from 1-9-1936. (Notification received too late for publication in 1936 Annual Report).

Mr. H. B. Chamba, African Clerk, 1st Grade, to Super Grade with effect from 1-1-1937.

Acting Appointments.

Miss H. M. Phillips, Nursing Sister, as Matron from 3-11-1937 to 31-12-1937.

Transfers.

Dr. E. J. Blackaby, Medical Officer, transferred to Zanzibar with effect from 26-6-1937.

Dr. R. Nicklin, Medical Officer, transferred from Zanzibar with effect from 18-9-1937.

Retirement.

Dr. H. H. B. Follit, Senior Health Officer, retired from the service with effect from 16-11-1937.

Resignations.

Miss B. Wells, Nursing Sister, with effect from 14-10-1937.

Miss M. Gibson, Nursing Sister, with effect from 30-10-1937.

Miss H. C. Potter, Nursing Sister, with effect from 11-12-1937.

Mr. J. H. T. Chirwa, Hospital Assistant, Junior Grade, with effect from 31-9-1937-

Termination of Temporary Appointment.

Miss C. Pritchard, Nursing Sister, with effect from 30-9-1937.

Deaths.

Nil.

Change of Title.

Mr. R. W. G. Pegg, Clerk and Medical Storekeeper, title changed to Office Superintendent an Medical Storekeeper with effect from 1-1-1937.

(B) LIST OF ORDINANCES ETC., ENACTED DURING 1937 AFFECTING PUBLIC HEALTH.

ORDINANCES.

11-2-1937.	No. 1 of 1937.	The Lunacy (Amendment) Ordinance, Cap. 77.
30-4-1937.	No. 7 of 1937.	The Townships (Amendment) Ordinance, Cap. 21.

RULES, ORDERS, NOTICES, ETC.

31-12-1936.	The Sanitary Boards Ordinance, Cap. 20: The Sanitary Boards (Amendment) Rule 1937.
27- 7-1937.	The Sanitary Boards Ordinance, Cap. 20: The Lilongwe Sanitary Board Rules, 1937.
10- 8-1937.	The Townships Ordinance, Cap. 21 : The declaration of Salima as a Township.
1- 9-1937.	The Dangerous Drugs Ordinance, Cap. 74 : The exemption of certain preparations fro Schedule of Dangerous Drugs Ordinance.
4- 9-1937.	The Dangerous Drugs Ordinance, Cap. 74 : The Dangerous Drugs Regulations, 1937.
5-10-1937.	The Sanitary Boards Ordinance, Cap. 20: The Amendment of Fort Manning Sanitar Area Boundaries.
16-10-1937.	The Townships Ordinance, Cap. 21: The Salima Township, Composition of Counc Rules, 1937.
25-10-1937.	The Public Health Ordinance, Cap. 73: Cerebro-Spinal Meningitis declared formidable epidemic disease within the Protectorate.
30-11-1937	The Public Health Ordinance, Cap. 73: Cerebro-Spinal Meningitis Rules, 193 Rules applied.

(C) FINANCIAL.

The total expenditure for 1937 was £51,322 0s. 2d., an increase of £3.286 14s. 7d. on th expenditure for 1936. The approved expenditure for the Department for 1937 was £52,712. I 1937 an analysis of the expenditure of the Department for the year revealed the following figures :–

	£	s.	d.
(i) Expenditure on central administration, indivisible expenditure, salaries, transport, passages, etc., ...	14,693	6	9
(ii) Expenditure on native services ...	28,985	7	3
(iii) Expenditure on non-native services ...	7,643	6	9
Total ...	£51,322	0	2

The total revenue of the Department was £1,528 7s. 7d. the amount being made up as follows :–

	£	s.	d.
(*a*) Hospital fees	1,049	6	7
(*b*) Sale of stores, etc., ...	421	16	0
(*c*) Pathological fees	28	7	0
(*d*) Radiological fees	28	18	0

From the unallocated stores, 6,144 bottles of 100 tablets of dihydrochloride of quinine and 81 packets of quinine bisulphate were sold to the general public, the amount realised being £1,027 7s. 8 In 1936 the amount realised from the sale of quinine was £945 17s. 3d.

The actual details of the expenditure of the Medical Department for 1937 are as follows:—

	£	s.	d.
Approved Expenditure, 1937	52,712	0	0
Actual Expenditure, 1937			
(*a*) Personal emoluments	33,432	4	8
(*b*) Other charges	17,730	5	9
(*c*) Special expenditure:			
X-Ray plant	92	9	1
Refrigerators	67	0	8
Total ...	£51,322	0	2

The amount expended represents 4.98% of the total revenue and 5.1% of the total expenditure of the Protectorate.

The method of compiling the Protectorate Statement of Assets and Liabilities was altered in 1937 and the percentages now quoted are not comparable with previous years.

SECTION II. PUBLIC HEALTH.

(A) GENERAL REMARKS.

During the year under review there happened two events which may have far reaching effects on both the future policy and development of Nyasaland.

Visit of Financial Commissioner

In the first place, the Protectorate was honoured by the visit of Sir Robert Bell, Financial Commissioner, whose terms of reference were:

"1. To enquire into the whole field of Government expenditure in Nyasaland, with particular reference to the cost of the administrative and technical services; and to report whether in your judgment the total expenditure can be legitimately reduced, whether by reorganisation or other means, without detriment to efficiency;

2. to examine the revenues of the Nyasaland Government and to advise whether any, and if so what, modifications in the existing system of taxation in Nyasaland should be effected;

3. to examine the question of further development of the country such as would improve social and economic conditions in Nyasaland and thus lead to a greater productivity of its sources of revenue;

4. to examine the Nyasaland public debt, the incidence of debt charges on the railways, the Nyasaland taxpayer and United Kingdom funds and to make recommendations".

Visit of Royal Commission

And in the second place, on the instructions of the Secretary of State, an official announcement was made to the effect that a Royal Commission was about to be appointed to visit the Territories of Southern and Northern Rhodesia and Nyasaland, and an extract, a portion of which is reproduced below, from an answer by the Under Secretary of State for the Dominions made in the House of Commons on 23rd February, 1937 was quoted:—

> "In accordance with the wishes of the Government of Southern Rhodesia and after consultation with the Governments of Northern Rhodesia and Nyasaland, His Majesty's Government in the United Kingdom propose to advise His Majesty to appoint a Royal Commission to visit the territories concerned. The terms of reference of the Commission will be as follows":—
>
> "To enquire and report whether any, and if so what, form of closer co-operation or association between Southern and Northern Rhodesia and Nyasaland is desirable and feasible, with due regard to the interests of all inhabitants, irrespective of race, of the territories concerned and to the special responsibilities of His Majesty's Government in the United Kingdom for the interests of the Native inhabitants".

It would appear, therefore, opportune as a preface to this Annual Report, to trace firstly and briefly, the historical development of the health services of the country, and, secondly, to review and evaluate, if possible, the work performed by the Medical Department during the last 25 years and lastly to make recommendations for the future development of the Department with due regard to the needs of the Protectorate in respect of the public health.

(I) Historical.

Prior to the year 1911, the medical staff of the Protectorate consisted of a Principal Medical Officer and nine medical officers assisted by three or four Asiatic sub assistant surgeons.

In early Annual Reports it is stated that this staff was so limited that any routine medical work in the Lake districts, which comprise a large part of the Protectorate, was precluded.

In 1911, the medical staff was increased by two medical officers and it became possible to post medical officers to five stations instead of four. These stations were :—

Port Herald, a dispensary only (temporary construction).

Zomba, European and Native hospitals.

Fort Johnston, European and Native hospitals.

Blantyre, European and Native hospitals.

Karonga, a dispensary only.

There was no sanitary staff in the Protectorate and a good deal of the medical work carried out amongst the natives was, and is still, due to missionary enterprise.

During the war routine medical work was considerably curtailed and, possibly owing to the extensive movements of natives, plague made its first appearance in 1916 ; in 1917 cerebro-spinal meningitis was introduced from what was then German East Africa and in the same year, owing to a lack of medical officers, the sleeping sickness investigations which were being conducted had to be abandoned.

Expansion of medical services

After the war, although the Geddes axe did not descend upon Nyasaland as heavily as it did upon some of her neighbours, little expansion of medical services was evident until 1930 when one additional medical officer was employed, thus, by decades, the rate of expansion was as follows :—

1911. Principal Medical Officer, eleven medical officers.

One Matron and four nursing sisters.

Four sub assistant surgeons.

1921. Principal Medical Officer, one senior medical officer, one medical entomologist, eleven medical officers. (In July, one medical officer retired and in November, one was promoted to sanitation officer).

One Matron and six nursing sisters.

Five sub assistant surgeons.

1931. Director of Medical Services, one senior health officer, one senior medical officer, one medical entomologist, thirteen medical officers.

One Matron and ten nursing sisters.

Two sanitary superintendents.

Nine sub assistant surgeons.

1936. Director of Medical Services, one senior health officer, one senior medical officer, one medical entomologist, one pathologist, fourteen medical officers.

One Matron and ten nursing sisters.

Two sanitary superintendents.

Nine sub assistant surgeons.

The stations at which medical officers had been posted to in 1911 were increased from five to seven after the war and the districts bordering on the Lake received more attention.

Rural dispensaries were also established. A considerable programme of medical work, involving special dispensaries for the treatment of venereal disease and additional native hospitals and rural dispensaries, was embarked upon ; by the end of the year 1922, the number of hospitals had increased to eleven and dispensaries to forty-four. In this manner, medical aid was made more available to the native population which had also in the meantime increased from 999,423 in 1912 to 1,203,060 in 1921.

During the next ten years the health services were further strengthened by the appointment of two European sanitary superintendents and the townships of Zomba and Blantyre reaped, in the first place, direct benefit from these appointments.

During this post-war period the European population of the country steadily increased from 563 in 1921 to 1,975 in 1931, the latter figure being the peak, as after 1931 a steady decline set in until in 1935 the European population had fallen to 1,781.

The number of patients treated at Government hospitals and dispensaries throughout the country has increased enormously, e.g. 10,580 in 1912 to 22,035 in 1921, to 271,250 in 1931, and, to 438,785 in 1936.

In 1934, the medical services were rendered more complete by the appointment of a pathologist, and thanks to a generous grant from the Colonial Development Committee a sum of some £73,000 was expended on the provision of twelve new native hospitals, 36 rural dispensaries, three maternity and infant welfare clinics and various houses for staff. The financial assistance provided also enabled many anti-malarial measures to be undertaken in the larger townships, markets were improved and large sanitary works carried out; not the least of the benefits conferred by this grant was the provision of wells and the improvement of village water supplies.

Unfortunately the medical staff was not increased in direct proportion to the expansion made in the hospital and dispensary system. In 1937, however, the medical staff was distributed more evenly over the country and of the 19 administrative stations, ten were in charge of medical officers, six were in charge of sub assistant surgeons and three were in charge of African hospital assistants.

Notwithstanding the large increase made in the accommodation for in-patients and reflected by a correspondingly large increase in the number of patients treated, the expenditure of the Department rose comparatively slowly during the period 1930 to 1935, the relative figures for expenditure being £42,015 and £47,128 respectively.

Public Health activities

With regard to the development of the public health side of the Department's activities, such general measures as were possible, were carried out by the district medical officers; only in the townships of Zomba and Blantyre, prior to 1920, was any specialization possible, the medical officers at these stations being designated Medical Officers of Health and receiving an extra allowance for performing sanitary duties.

In 1922, a sanitary officer was appointed; up to that date public health legislation had been governed by the following Ordinances:—

(i) The Townships Ordinance, 1912.

(ii) The Epidemic and Contagious Diseases Ordinance, 1903.

(iii) The Infectious Diseases (Notification) Ordinance, 1908.

The first of these gave power to the Town Councils to make by-laws. With regard to the second, there was apparently no legislation relating to the public health of rural areas or of areas not within the boundaries of townships, thus the introduction of a Public Health Ordinance which could be applied to the whole Protectorate was urgently required.

No control of Town Planning existed. The position with regard to the administration and execution of public health measures is described in the Annual Report for 1926 as follows:—

> "The Sanitation Department consists of one European (the Senior Sanitation Officer), who was absent on leave for eight months of the year, and 15 native sanitary inspectors. In addition, all medical officers are *ex-officio* medical officers of health for their districts and in two cases (Zomba and Blantyre) of a township also. Their time is, however, so fully occupied with routine work of a more purely medical nature that they are not able to devote much attention to preventive work. The total amount available as personal emoluments for the Department, including both officers and labourers, is £2,481, £250 is allocated to sanitary works and £150 for their upkeep. The greater part of this £2,481 must necessarily be absorbed in work done in the larger European townships to the almost total exclusion of district stations. It is evident then, that, with such shortage of both staff and money, little work of any permanent value can be effected".

Since that time, two European sanitary superintendents have been appointed and provision is made for a temporary relief when either of these officers proceeds on leave. The native sanitary staff has also been slightly increased. A Public Health Ordinance was introduced in 1932; a Sanitary Boards Ordinance, giving the Governor powers to appoint local authorities with the general object of securing proper sanitary conditions, etc., in settlements or areas, not being townships within the meaning of the Townships Ordinance, was provided in 1929, and the old Townships Ordinance was brought up to date and amended by the Townships Ordinance, 1931.

These developments in local government, so far as public health measures were concerned, were further amplified in 1933 by the passing of the Native Authorities Ordinance which gave a duly constituted Native Authority fairly wide powers to issue orders in respect of certain sanitary and hygienic measures to be undertaken by natives within the area.

Training of African staff

Lack of European staff no doubt militated against the successful training of the African personnel of the Department in earlier days and the subject does not appear to have merited much attention until recent years. In 1922, it is stated in the Annual Report for that year that "dispensers are not sufficiently trained and that such training as has been given has been performed at Missions or at the African Hospital, Zomba". The 1928 Annual Report again refers to the matter:—

"Better training for dispensers is much needed. At present the training is given, by employing young men who have had some education at the mission schools, at the native hospital, Zomba, where they learn their work chiefly from the senior dispensers and dressers. Regular classes and tuition from a European instructor are required. This has been under consideration for some years now, but the scheme has had to be postponed to give place to other more pressing requirements".

In 1929, a scheme was evolved and put into operation for training sanitary inspectors and regular classes were commenced. In 1930, a Report on the Nyasaland Medical Service by Dr. J. O. Shircore, C.M.G., was published; in this report Dr. Shircore recommended that a medical school should be established at Zomba, that a new hospital should be built and that the old hospital should be utilized as a school and that all branches of medical and sanitary work should be instituted, the appointment of a medical instructor and an assistant medical instructor was envisaged.

In 1935 the new hospital at Zomba was completed and now functions as a teaching institution. Two medical officers, one of whom is specially qualified in surgery and two nursing sisters one of whom is trained in maternity and infant welfare work and the other, as a sister-tutor, are posted to the establishment. An infant welfare clinic and a maternity ward have been opened; a well equipped theatre deals with the considerable amount of surgical practice. A modern X-ray apparatus has been installed and a venereal clinic has been commenced.

The training now undertaken at this medical centre includes:—

(*a*) The training of hospital and dispensary dressers.

(*b*) The training of native nurses; maternity work is also taught.

(*c*) The training of laboratory assistants.

(*d*) The training of native sanitary inspectors and rural sanitary inspectors.

In 1932, a medical officer was placed in charge of a small laboratory and in 1934 the post of Pathologist was filled and the Department reaped the great benefit of being able to obtain scientific investigation into its problems and to tackle locally the medico-legal questions which had hitherto, to some considerable extent, remained unsolved.

The Pathological Laboratory is adjacent to the new African Hospital in Zomba and completes the medical unit.

Medical facilities for the immigrant population.

Medical facilities for the treatment of European officials and non-officials have not increased to any appreciable extent since the days before the war; the Annual Report for 1912 states there were European hospitals at Blantyre, Zomba and Fort Johnston, now there are European hospitals at Blantyre and Zomba only.

The actual buildings are the same, some additions and alterations having been made. During the present year, a sum of money was subscribed by the non-official community in the Lilongwe district for the purpose of erecting a small European hospital and Government has recommended to the Secretary of State that if this hospital is built, it should be staffed and administered by Government.

A small sum is granted to the mission hospital at Blantyre for the treatment of Asiatic patients; a ward is also provided at the African Hospital, Zomba, for this specific purpose.

Medical Entomologist's investigations

Nyasaland has been fortunate, in that, since 1918, a medical entomologist has figured on the establishment of the Medical Department and it would take a volume much larger than this Annual Report to recount the numerous scientific investigations and voluminous research work carried out by the Entomologist with much success. Suffice it to say that the main investigations have been concerned with the bionomics of the tsetse fly, the life history of the Culicidae and Tabanidae, investigations on the indirect transmission of trypanosomiasis by vectors other than *Glossina*, investigations into the transmission and cyclical development of the *Leishmania* within *M. spectanda*, investigations into the part played by non-biting, blood drinking, muscid flies in the dissemination of pathogenic organisms, etc., etc. Perhaps one of the most important works undertaken by the Entomologist was the attack initiated by him in 1925 on the advance of the tsetse fly from the north in the Dowa and Lilongwe districts of this Protectorate, the scheme which, briefly, consisted of clearing, settlement and agricultural development, being entirely successful.

Expansion of Medical Department

The expansion of the Medical Department is shown concisely in the following table:—

	1912	1921	1929	1937
Principal Medical Officer or Director of Medical Services	1	1	1	1
Senior medical officer		1	1	1
Senior health officer			1	1
Medical officers	11	10	10	14
Entomologist			1	1
Pathologist				1
Matron	1	1	1	1
Nursing sisters	4	7	10	10
Sanitary superintendents ...			1	2
Sub assistant surgeons ...	4	5	8	9
African hospital assistants ...			5	16
African sanitary inspectors ...			16	19
African hospitals	3	10	12	15
European hospitals	3	3	2	2
Expenditure	£10,015	£18,629	£35,039	51,322
European population	773	1,655	1,936	1,894
Asiatic population	463	563	1,117	1,631
African population	999,423	1,203,060	1,356,945	1,635,804
Dispensaries	6	10	87	93
In-patients beds		297*	170	706

NOTE. The Entomologist, Dr. W. A. Lamborn, O.B.E., was appointed to the medical staff on 13th July 1918. Owing to the war his services were not available until 1919 when after a few months service in the country he was transferred to the Federated Malay States and resumed duty in this Protectorate on the 5th January, 1922.

II. Evaluation of work done and progress made.

Dr. Shircore, in the report previously mentioned above, states that, in his opinion,

> "With the exception of an almost negligible addition to staff and a few beds to some of the hospitals, little progress had been made until the year 1929.
>
> At that time the estimated population was 1,936 Europeans, 1,117 Asiatics, and 1,356,945 Africans; the approximate total number of beds in the hospitals was 170, the total number of in-patients treated 3,821.
>
> The Department is merely in embryo. Accurate statistics and comprehensive data, which together reflect the cause and distribution of disease, and form a basis for investigation and remedy, are not yet available............the first step towards the initiation of a preventive system must, for the present, be in the establishment of a well staffed and organised hospital and health service, before further progress may be anticipated."

Since the time when the above opinion was formulated, much water has passed under the bridges and considerable progress has been made in the curative medical work of the Protectorate. Both the European, Asiatic and Native staffs have been considerably increased, hospitals and dispensaries have been provided, medical facilities generally have become more available and the general standard of such facilities raised; *pari passu* with the increase of medical services, the public demand has also increased, natives are commencing to have faith in European methods of treatment and even the women, the last to be convinced or to move aside from the rigid path of custom, are timidly seeking advice for themselves and their children.

The African hospitals are, in all cases, of modern construction and are, or are in the process of being, reasonably well equipped, the standard aimed at being that adopted at the African Hospital, Zomba. Gradually, year by year, the other hospitals are being brought into line, the aim being to provide adequate treatment, care and nursing attention for the patients attending. The needs of the rural areas are being to some extent met by the dispensary system which is steadily expanding. The medical education of the African staff is being undertaken and a definite programme has been adopted and is being adhered to.

The results of this increase in expenditure on both staff and institutions are evidenced by the departmental statistics which show a relatively enormous increase in the patients, both in-patients and out-patients, treated, e.g. in 1929 the in-patients numbered 3,821 while in 1936 the number was 9,757. Surgical work is also progressing to an astonishing degree and reference to the Annual Reports of 1935 and 1936 gives some indication of what is being accomplished.

---

*Includes 142 beds reserved for cases of venereal disease

Some photographs of interesting cases and surgical operations are include in this Report.

More recent developments are, the training of native women as nurses and the opening of a welfare centre at one of the Government African hospitals.

Preventive medicine

On the preventive side of medicine the picture presented is by no means so pleasing.

In the larger townships, considerable progress has undoubtedly been made sanitary and anti-malarial works have been carried out, the disposal of rubbish and night soil satisfactorily dealt with, native markets have been set up and developed, water supplies have been installed, drainage schemes carried out and in general the amenities provided bear comparison with other small towns situated in more advanced non-tropical areas.

It must be understood that in the rural districts the difficulties not only of the execution of public health measures but of inculcating the principles of hygiene amongst the indigenous races, present a special problem largely set by the character, intelligence and distribution of the population.

With a native population numbering some 1½ million, few of whom are congregated in towns or other centres, instruction in methods of sanitation and in the prevention of disease requires a relatively large, well informed and active staff. Not only is the population scattered over wide areas, but it is in the main, primitive, uneducated and exceedingly poor, and it would be true to say that in a large percentage of rural districts, the poverty is such that of the remedial measures recommended by the medical officer practical effect can be given to the minor ones only. Natural apathy and prejudice against European customs have to be overcome, even so, it is far easier to get a native to dig a latrine than to use it.

It is undoubtedly a fact that at stations where one medical officer only is posted, the claims of the immigrant (official and non-official) population (European and Asiatic) and the administration of the hospital, tie the medical officer down to the station and greatly restrict his work in native areas, e.g. the medical officer of a station. such as Blantyre, where there is a small European hospital of 10 beds, is prevented to a large extent, by reason of his 'town' duties, from visiting, or attending to the needs of his district, which in this particular instance contains some 75,000 native inhabitants.

Efforts have been made, in many instances very successfully, to elevate the general standard of living in rural areas by the development and expansion of the dispensary system, the actual treatment centres have increased from 10 in 1921 to 93 in 1936. The educational standard of the dispensers or dressers in charge is being raised, the work performed at the centres has been developed to include sanitary inspections of the neighbouring villages and vaccinations; in some instances the wife of the dresser has been trained in midwifery and works in the district. More recently, health exhibits, under which term may be included the distribution of health pamphlets, talks on hygiene, the exhibition of model houses, markets, wells, latrines, etc., have been introduced and native interest has been definitely aroused. Infant welfare work, so far as the staff of the Department permits, has been commenced and for the last *eight* years grants have been made with a view to encouraging missions to undertake this work.

The training of native nurses has been commenced at the African Hospital, Zomba. For the last three or four years medical officers have been advised to tour their districts and to make medical surveys of certain villages or areas, and as a consequence a considerable mass of interesting statistics on the morbidity of such areas has been collected.

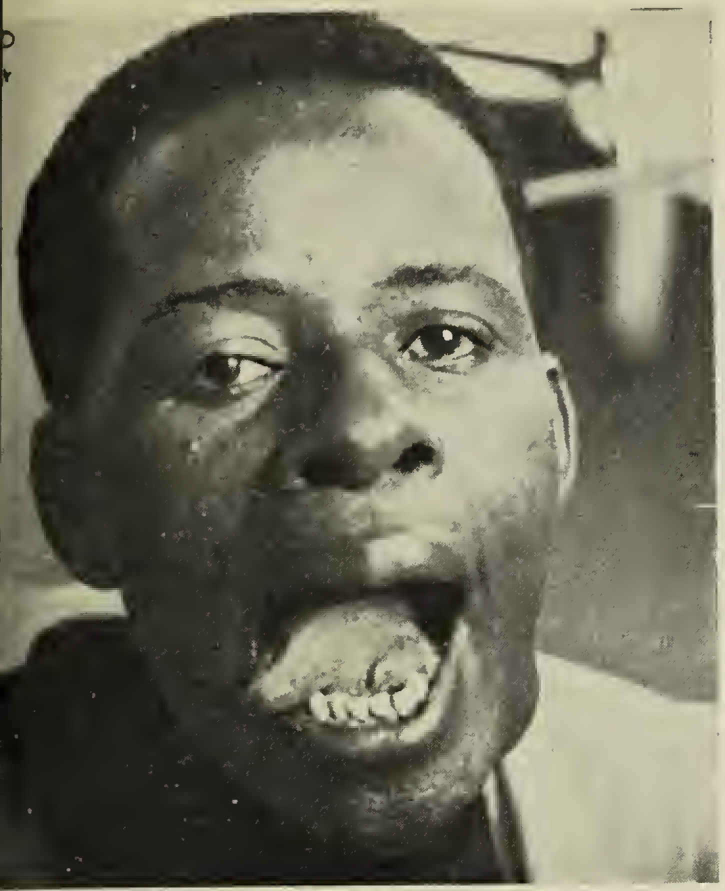
The regular medical examination of school children, both European and Native has been undertaken, the scope of the work depending upon the staff available.

Increased attention has been given to the protection of water supplies, wells, springs, etc.; boring of wells has been undertaken by the Geological Department.

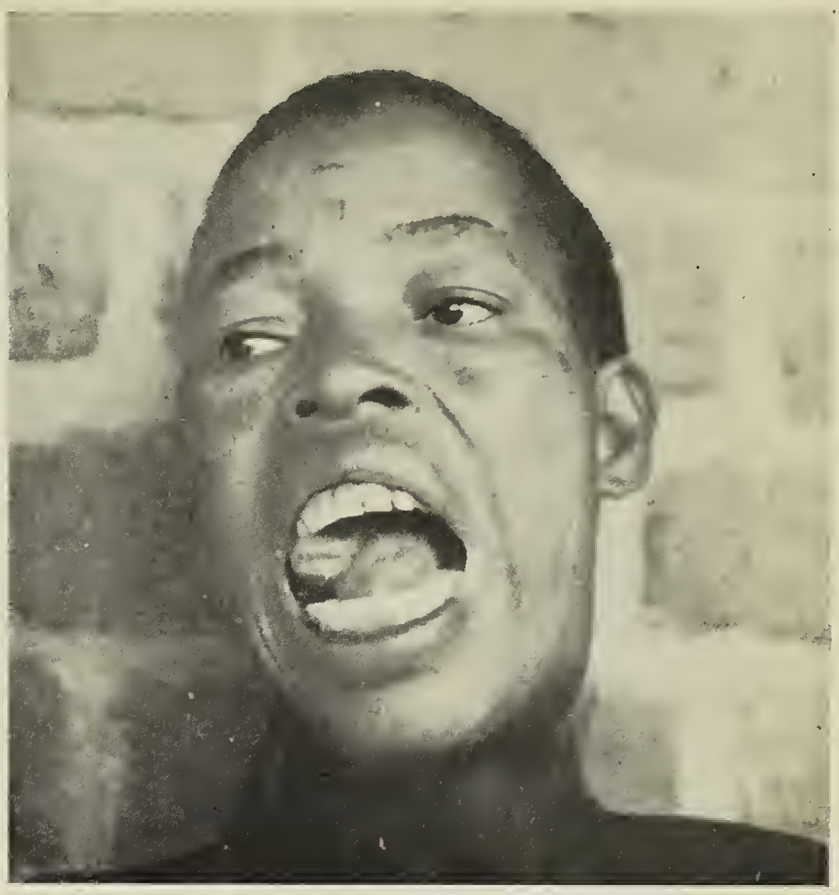
Owing to the combined efforts of the medical staff, Jeanes' teachers and Native Authorities, successful attempts have been made to build better houses and to keep villages cleaner. The number of latrines in rural areas is slowly increasing—a greater percentage are being used. Inspection of labour conditions is being carried out, in some instances employers of labour are improving conditions generally.

Value of progress made by Health Services

This short summary of the principal measures undertaken by the Department makes comforting reading, but even so, it is more than doubtful, if, with the exception of the areas controlled by Township Councils and Sanitary Boards, little, if any, real progress in preventive medicine has been accomplished throughout the country as a whole. This statement is not intended to belittle in any way the efforts made by the Department generally or to detract from the arduous and self-sacrificing work, more often than not, of great scientific interest and value, performed by individual officers, but is a plain statement of fact. There has been a vast amount of work done, and the seeds



1. Compound Ranula.



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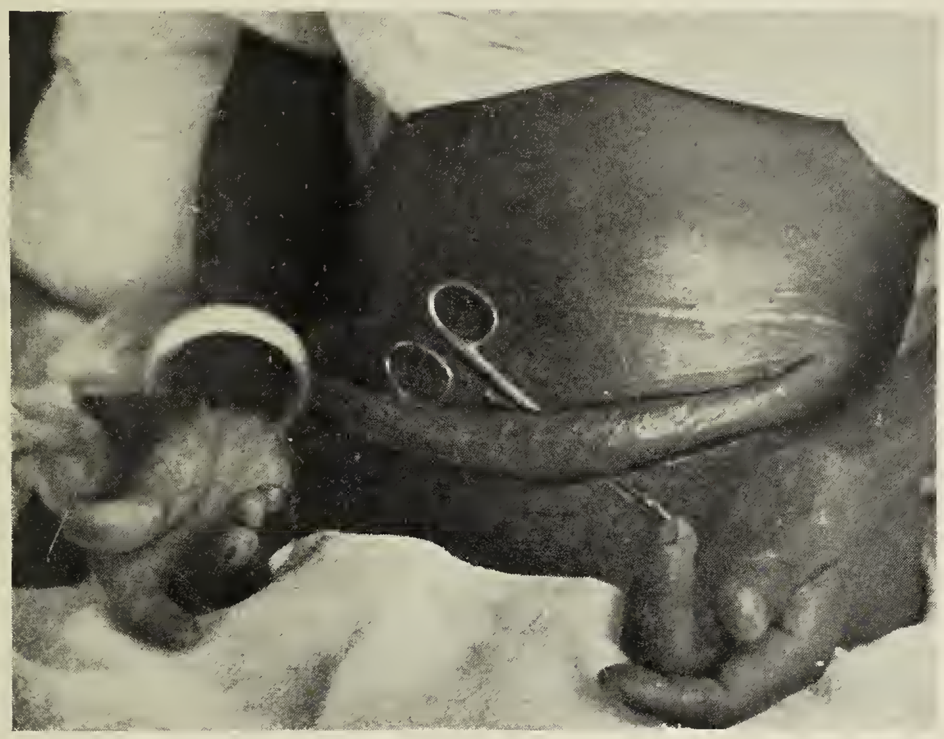

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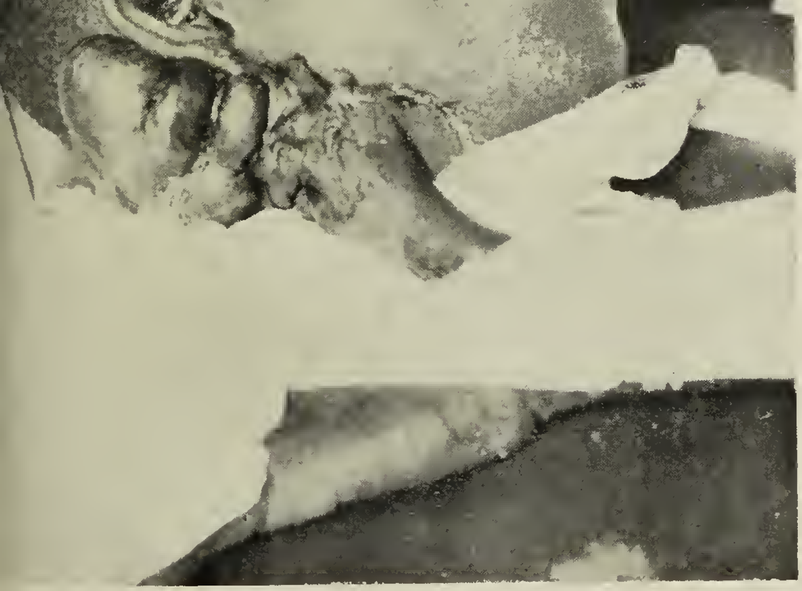

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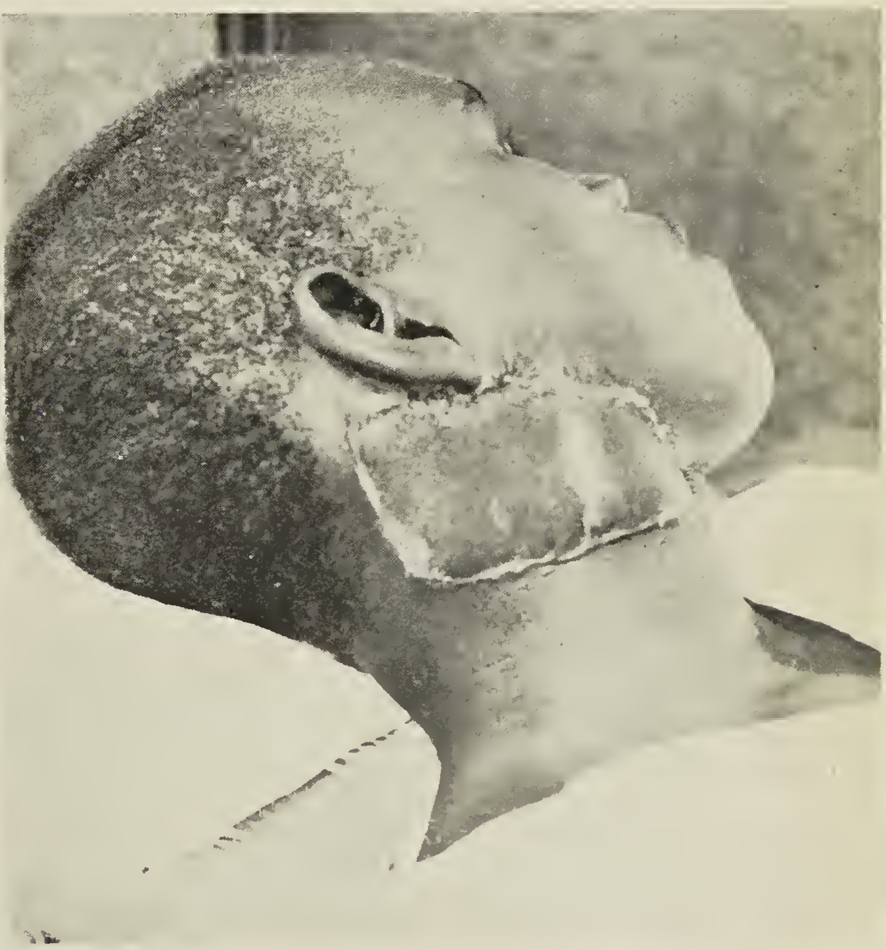

5.

graphs 3, 4 and 5 show three stages in the transfer of a pedicle graft for the replacement of tissue los in the removal of a tumour of the neck.

of hygiene have been sown well and truly and not altogether on stony ground, but there is no reason to suppose that the incidence of endemic diseases such as malaria, ankylostomiasis or schistosomiasis has been affected to any appreciable extent. Yaws, probably is not so prevalent, but the incidence of venereal disease and tuberculosis appears to be on the increase; leprosy despite the valiant efforts of the missions, shows no signs of being on the wane.

Unfortunately the somewhat isolated efforts made by the Department to collect vital statistics have not, as yet, furnished sufficiently reliable information to enable any authoritative statements to be made with regard to infantile and maternal mortality rates, but it would be surprising to find that these rates had diminished.

One great fact stands out as a monument to European protection and that is the increase of the native population which in 1912, was just under one million and is now well over 1½ millions, but even this state of affairs may be attributed to the *Pax Britannica* rather than to the developmental efforts of the medical services.

III. Proposals for future development.

Proposals for re-organization and development of Health Services

In the first place it is suggested that both officials and non-officials are not always fully conversant with the functions of a medical and health service in a tropical dependency.

The view is held by many that the main, if not the only, function of the Health Service is to treat and heal the sick and look after the drains and such like duties. In reality, the provision of hospitals and the treatment of sick, essential services as they are, form one, and that perhaps not the most important, of the services required of a Public Health Department in an African Protectorate.

Waste of effort

From an economical point of view a great deal of effort is at present being wasted by the Medical Department of this Protectorate for the following reasons:—

(i) At no station except Zomba is there more than one medical officer.

(ii) At no native hospital except the African Hospital, Zomba, are there any European nursing sisters.

(iii) At only three African hospitals is there any clerical assistance provided and at two of these hospitals, the arrangement is purely temporary and has been made on account of the increased work involved by the medical examination of labour recruited for South Africa.

(iv) At no station with the exception of the larger townships of Blantyre and Zomba, are there any European sanitary inspectors.

(v) There are no health sisters or lady medical officers employed by Government.

These deficiencies in the equipment of the medical services narrow the scope of the Department both in curative and preventive medicine and handicap, to a serious extent, the institution of preventive medical work in the rural areas.

Duties of a medical officer in Nyasaland

To realise more fully the implication of the present defective organization it may be of interest to survey the normal activities carried out at a Government medical station in Nyasaland and to estimate how far the requirements of the rural population are actually satisfied. To commence with, the medical officer is by himself, as at Zomba only, is there more than one medical officer; he has a hospital of 50 or more beds to look after, assisted as a rule by a native hospital assistant who usually can be relied upon to attend to 'repeat' out-patients, to carry out instructions with regard to the administration of the hospital and who can treat, in a fairly satisfactory manner, the ordinary simple complaints. With the exceptions noted above, the medical officer has no clerk, all returns—and there are many—ledgers, correspondence, hospital fee accounts, vouchers, payments, etc., have to be attended to personally by the medical officer, for, if these duties are left to the native medical staff as they would have to be in the absence of trained clerical staff, chaos usually results. In the station the medical officer has to attend to all Government officials, their wives and children; he acts as police surgeon and performs medico-legal work when required; he is responsible for the sanitation of the station area, and, theoretically, for the whole district, but as there are no European sanitary inspectors, except at Blantyre and Zomba, and the natives trained in this branch of preventive medicine require considerable supervision, any aspirations he may have in this connection are in the nature of 'pious hopes' and seldom can be practically realised. He has to investigate all cases of epidemic disease.

He has to train, so far as he is able, his native subordinate staff, and as there are no European nursing sisters the medical officer, with the best will in the world, cannot ensure a very high standard of nursing attention at the average Native hospital.

He may have the doubtful assistance of a native woman, too frequently untrained and uneducated, in the women's wards. As the training of native nurses has only recently been commenced, such assistance is often unreliable, and technical duties have perforce to be carried out by the male dressers attached to the hospital; it is no wonder, therefore, that the women still fight shy of entering hospitals especially when pregnant or in labour or when suffering from venereal disease.

He attends to the needs of the non-official population (European or Indian) as at only a few stations are there mission doctors within call and there are no private practitioners in the Protectorate.

In the district there is a varying number of rural dispensaries (3 - 8) in charge of dressers or dispensers; in many instances these men are still ignorant, slovenly, careless and inefficient, and the work performed by them is at a corresponding level. Gradually these inefficients are being weeded out, but at the present rate of progress it will take years before the Department possesses a well trained and efficient subordinate staff. Some attempt has been made to increase the duties of the more intelligent of the rural dressers, who are instructed to visit villages, advise on elementary sanitation, to vaccinate all young children, etc., etc., but this work to be of value requires effective supervision which with the lack of staff is not available.

Occasionally, perhaps once or twice during the year, the medical officer gets out of the station and camps for a few days in a rural area, examines and treats the sick and advises headmen and Native Authorities on sanitary measures, he is, however, liable to instant recall if a European should fall sick, no other course could be contemplated. He, as a rule, possesses a car, and is expected to make monthly or bi-monthly visits to each dispensary, often the dispensary is 50 or 60 miles away, so the visit is hurried and generally unproductive; *he cannot afford to be away long from the station.*

With the exception of his annual camps, he has little opportunity o instructing or teaching hygiene or demonstrating sanitary measures in a practical manner; he has no European or Native sanitary staff for rural work so that effort, in this direction, is stultified at its source. He may make, and often does make, suggestions with regard to the improvement of water supplies and the construction of latrines, but, he is seldom able to observe personally the results of his efforts and has to rely on native reports which are notoriously unreliable.

Nutrition, generally, and the question of diets is practically untouched some education in this direction is no doubt imparted automatically to patients by providing them with a reasonably adequate diet when in hospital, but the major problem of the diets for infants, children and women cannot, in th absence of health sisters, be tackled by the Medical Department. The medica officer during the course of the year, visits and inspects a native school o schools. Much valuable information is extracted from such visits, but after treatment can seldom be carried out owing to other and more pressing duties He also, from time to time, visits estates where labour is employed and advise the employer on dietetic questions, on the siting of huts, on the treatment and prevention of illness and so forth. Such visits are appreciated, but regula advice and inspection are out of the question.

Actual value of
services rendered

The picture presented is without doubt a gloomy one*, perhaps too gloom a one, but it is sufficiently realistic to raise two questions, (i) is the Governmen obtaining full value for its expenditure on health services? and (ii) are th natives deriving full benefit from the taxes they pay?

The question of
Staff and Funds

It will be realised that the problem is, in the main, an educational one more trained staff is necessary in order that more staff may be trained. A nucleus of European women trained as doctors, nurses, in infant welfare an maternity work, in health visiting, etc., must be employed in order that instruc tion in hygiene, in the care and feeding of infants, in ante and post-natal wor may be given to as many native women as possible. The provision of mor European sanitary staff for the initiation of sanitary and preventive measure in the rural areas is essential, not only to train local natives to carry out such duties but to supervise and to assure continuity of measures already inaugurated

Proposals for
re-organization

In order to prepare the way for the additional personnel which is so vitall important, a certain amount of redistribution and centralization of staff an reorganization is necessary. Additional funds will be required for both sta and buildings. There is at present, at every administrative centre throughou the Territory, either a hospital or a large dispensary with some accommodatio for in-patients; in all, there are six hospitals with 50 or more beds, nine with 30 beds, and three of the larger type dispensaries. It is an accepted fact that small hospitals are uneconomical and it is suggested that three of the 50 bed units should be increased to 100 beds each and that the complete medical unit at these special centres should consist of:—

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*What is actually being done by the Department is narrated under the relative headings in th subsequent parts of this Report.

a hospital of 100 beds;
an X-ray plant;
two medical officers;
one European nursing sister;
one European health visitor;
one European sanitary inspector;
one ambulance.

The stations at which, in the first instance, this augmented staff and increase in accommodation should be provided are Fort Johnston, Lilongwe and Mlanje. As far as medical officers are concerned, repostings and redistribution of staff with the addition of one new appointment, i.e. a district surgeon, would allow the suggested concentration of qualified staff to take place.

How re-organization could be effected

Thus, the medical officer, Cholo, would move to Mlanje, the medical officer, Dedza, to Lilongwe, and the medical officer, Blantyre, replaced by a district surgeon, to Fort Johnston. Six new appointments to the nursing staff would require to be made and three additional appointments to the European sanitary personnel. The requisite number of reliefs would be required. Buildings to accommodate the additional staff would be needed and the accommodation at the African hospitals at Lilongwe, Fort Johnston and Mlanje would be increased to 100 beds each. The areas served by these hospitals would be correspondingly increased, thus:—

Mlanje district hospital would deal with cases from Cholo, Mlanje and Chiradzulu, the hospital at Chiradzulu would be placed under the care of a hospital assistant instead of a sub assistant surgeon. Fort Johnston would serve the needs of its own district and extend its services to the south as far as Liwonde *boma* and north to Ncheu *boma*. Lilongwe would deal in addition with the districts of Dedza, Fort Manning, Dowa and Kasungu, the small hospitals at these stations at present in charge of Asiatic sub assistant surgeons would be taken over by African hospital assistants. All thirty bedded hospitals taken over by hospital assistants could probably have the accommodation lowered to 15 beds; the maintenance charges would be correspondingly reduced

The proposals may be represented in tabular form, thus:—

Stations affected by proposals	Increase of staff proposed		Decrease of staff		Cost of new proposals for the first year	Savings
					£	£
MLANJE ...	Medical officer	1			—	
	Nursing sister	1			240	
	Health visitor	1			240	
	European sanitary inspector ...	1			372	
	African hospital assistant ...	1			50	
	African sanitary inspector ...	1			15	
	African clerk	1			50	
	Ambulance	1			250	
CHOLO ...	African hospital assistant ...	1	Medical officer ...	1	50	
CHIRADZULU ...	African hospital assistant ...	1	Sub assistant surgeon	1	50	240
FORT JOHNSTON ...	Medical officer	1			—	
	Nursing sister	1			240	
	Health visitor	1			240	
	European sanitary inspector ...	1			372	
	African hospital assistant ...	1			50	
	African sanitary inspector ...	1			15	
	African clerk	1			50	
	Ambulance	1			250	
BLANTYRE ...	District surgeon	1	Medical officer ...	1	300	
LILONGWE ...	Medical officer	1				
	Nursing sister	1			240	
	Health visitor	1			240	
	European sanitary inspector ...	1			372	
	African hospital assistant ...	1			50	
	African sanitary inspector ...	1			15	
	African clerk	1			50	
	Ambulance	1			250	
DEDZA ...	African hospital assistant ...	1	Medical officer ...	1	50	
FORT MANNING ...	African hospital assistant ...	1	Sub assistant surgeon	1	50	240
DOWA ...	African hospital assistant ...	1	Sub assistant surgeon	1	50	240
KASUNGU ...	African hospital assistant ...	1	Sub assistant surgeon	1	50	240
Maintenance of ambulances ...					600	
Addition to hospitals					6,000	
Houses ...					5,950	
Equipment ...					2,400	

With regard to the health work of the Department generally during 1937, there is little new to record.

The approved programme for the training of Africans had to be modified considerably owing to sickness amongst the nursing staff (which is barely sufficient to carry on under favourable conditions). Casualties in the cadre of nursing sisters necessitated the withdrawal of a nursing sister from the African Hospital, Zomba, and the consequent temporary cessation of special duties at that institution. Provision has been made in the approved estimates for 1938 for another nursing sister to provide for such emergencies.

Conferences

No conferences were attended by members of this Department during 1937. The principal conferences affecting the medical services in the East African Group are :—

(i) The Standing Medical Research Committee for East Africa.

(ii) The Conference of the Directors of Medical Services of the East African Territories (including Northern Rhodesia),

and

(iii) The Conference on Co-ordination of General Medical Research in East African Territories.

It was originally intended that the Research Committee should meet twice a year and that meetings should if possible be arranged in rotation in each of the six territories concerned. It may, however, be found, after trial, that yearly meetings of the Research Committee will suffice. The meetings of the Research Committee and the Conference of the Directors of Medical Services are held at the same time. In any case it was, so it is believed, intended that a meeting of the Research Committee should immediately precede the *biennial* meeting of the Conference on Co-ordination of General Medical Research in East African Territories. These conferences are an important development in the medical policies of the East African territories as by such means adequate consideration is given to the particular needs of any one colony when the research programme for the whole group is being planned. Great advantage accrues from personal discussion between Heads of the medical services on matters such as medical administrative problems, the training of Africans, public health legislation, local regulations, conditions of service and the like, so that, participation in these conferences is of great value to this group of countries and regular attendances by delegates at all meetings are not only desirable but essential. In practice, however, it is found that financial or other considerations frequently make it impossible for one or other of the representative members or delegates to attend. For example, the Director of Medical Services, Nyasaland, has attended one only of the meetings of the Standing Medical Research Committee and two meetings only, of the Conference on Co-ordination of General Medical Research in East African Territories, have been attended by a delegate from this Territory. The conclusions of the Royal Commission appointed to report on the closer co-operation and association between Southern and Northern Rhodesia and Nyasaland, may, when received, modify to some extent the constitution of the present East African Conferences.

Epidemic diseases

During the year a somewhat serious outbreak of cerebro-spinal meningitis occurred in the Southern Province and necessitated promulgation of special rules under the Public Health Ordinance to deal with the movements of natives, etc. The outbreak is dealt with in more detail later on in this Report.

Rabies

Rabies continued to cause uneasiness, particularly to the European population, during the year and showed no signs of abatement; towards the end of the year Government authorised, on the advice of the Native Welfare Committee, the formation of a special committee to investigate and report upon the position.

Medical surveys

Although shortage of staff seriously interfered with any expansion of the schemes for rural sanitary development, there is no doubt that the system of medical surveys instituted towards the end of 1934 are having a slow but definite effect on raising the standard of living of the rural population. Requests from Native Authorities and village headmen are being continually received for visits of medical officers and, in nine cases out of ten, a week or so spent by a medical officer travelling from village to village is one of the most productive forms of health propaganda; such tours are time well spent and are of considerable material benefit to the villagers themselves.

Infant welfare and maternity work

It is axiomatic to state that progress in health measures depends upon the provision of funds and staff, and it is with regret, so far as Government itself is concerned, little progress can be reported in a field of medical endeavour which in the opinion of the writer holds out a better prospect of permanent success than any other, i.e. the work undertaken for the benefit of the women and children of the country. Without the provision of health visitors and the establishment of infant welfare and maternity centres, without the provision of facilities for the adequate nursing of and attention to the women and children who are admitted to African hospitals, and without adequate accommodation for the native women who are undergoing training as nurses and midwives, little development or permanent benefit is likely to occur. Almost the position of stalemate has been reached. The one infant welfare clinic established by this Department can do little more of itself; so far as nursing is concerned, the women of this Territory are still primitive and backward and great difficulty is experienced in obtaining suitable candidates for training, and, during training, the losses occasioned by marriage, etc., are so great that the present African Hospital, Zomba, may almost be said to be more of a marriage mart than a centre for instruction. On the other hand, Government has been able to collaborate more fully with the missions and the grants for infant welfare purposes given by Government will be increased from £700 to £800 in 1938 for certain medical missions undertaking this particular branch of work.

Courses of instruction

The following officers attended courses of instruction in 1937:—

(i) Dr. T. A. Austin, in Public Health, at Trinity College, Dublin.

(ii) Dr. E. J. Blackaby, (now transferred to Zanzibar) course of study for the Fellowship of the Royal College of Surgeons, Edinburgh.

(iii) Dr. L. C. Mayne, a three months' course in Bacteriology and Parasitology, at Queen's University, Belfast.

It is with great pleasure that we offer our hearty congratulations to Dr. W. A. Lamborn, O.B.E., on his election to the Membership of the Royal College of Physicians, London, and to Dr. Austin in not only obtaining the Diploma of Public Health but obtaining it with first class honours and first place and being awarded the De Renzy Centenary Prize.

Retirement

Dr. H. H. B. Follit retired during the year and the loss of a loyal colleague and a good sportsman will be felt by the Department in general.

Leprosy

The usual grants were made to missions undertaking leprosy work. Unfortunately, with the increase in cost of foodstuffs and with more lepers coming in voluntarily for treatment, the grants were insufficient to enable one of the missions with a waiting list to undertake a scheme for expansion; financial circumstances made it impossible for Government to hold out any hope of an increased grant for 1938.

Training of Africans by missions

The Church of Scotland Mission at Blantyre received further grants from Government during the year and at present a total sum of £1,000 is paid annually to this mission. This grant enables the mission to maintain a full European staff of two doctors (one of whom is a lady medical officer) and to undertake the training of (i) Africans for the Hospital Assistant grade i.e. the highest grade of the African medical staff and (ii) native nurses and midwives. The mission hospital is also by this means subsidized to treat African patients sent there by Government.

Medicines and dressings are sold at cost price to "bona fina" planters maintaining a dispensary on their estates, and also to missions in emergencies and when additional drugs, etc., are urgently necessary. The sale of drugs, etc., on this account amounted to £421 16s. 0d. during the year. Free issues of drugs, syringes, etc., are made to missions undertaking the treatment of leprosy and hookworm. The value of such issues during the year amounted to £28 1s. 10d.

Returns for the Year.

The numbers of in- and out-patients treated at Government hospitals during the year are compared in the following table with the numbers treated for previous years:—

	1933	1934	1935	1936	1937
EUROPEANS:					
In-patients ...	178 ...	188 ...	186 ...	165 ...	223
Out-patients	1,217 ...	1,308 ...	1,693 ...	1,685 ...	1,215
AFRICANS AND OTHERS:					
In-patients ...	7,322 ...	9,044 ...	10,052 ...	9,757 ...	10,595
Out-patients	353,344 ...	375,852 ...	436,906 ...	435,489 ...	426,582*

* Note:—These figures represent the sum total of African in- and out-patients.

The incidence of the diseases treated at Government hospitals during the year is shown overleaf:—

INCIDENCE OF DISEASES ACCORDING TO GROUPS.

		Hospitals		Dispensari
I.	Epidemic, Endemic and Infectious Diseases	13,301	...	20,003
II.	General Diseases not mentioned above	1,838	...	4,883
III.	Affections of the Nervous System	9,574	...	27,942
IV.	Affections of the Circulatory System	297	...	78
V.	Affections of the Respiratory System	18,432	...	47,656
VI.	Diseases of the Digestive System	26,155	...	58,341
VII.	Diseases of the Genito-urinary System	5,761	...	2,677
VIII.	Puerperal State	191		—
IX.	Affections of the Skin and Cellular Tissues	24,745	...	72,026
X.	Diseases of Bones and Organs of Locomotion	4,060	...	6,432
XI.	Malformations	11		—
XII.	Diseases of Early Infancy	9		—
XIII.	Affections of Old Age	124		—
XIV.	Affections produced by External Causes	17,658	...	52,527
XV.	Ill-Defined Diseases	3,323	...	9,753
	Total	125,479	...	302,318

The following diagrams, I—IV, show the incidence of the epidemic, endem and infectious diseases, the proportions of these diseases treated at hospita and the proportion of in-patient deaths amongst the diseases in Group I. and i all groups of diseases.

DIAGRAM I.

Showing the proportion of infectious, systemic and other diseases treate at Government hospitals (excluding rural dispensaries).

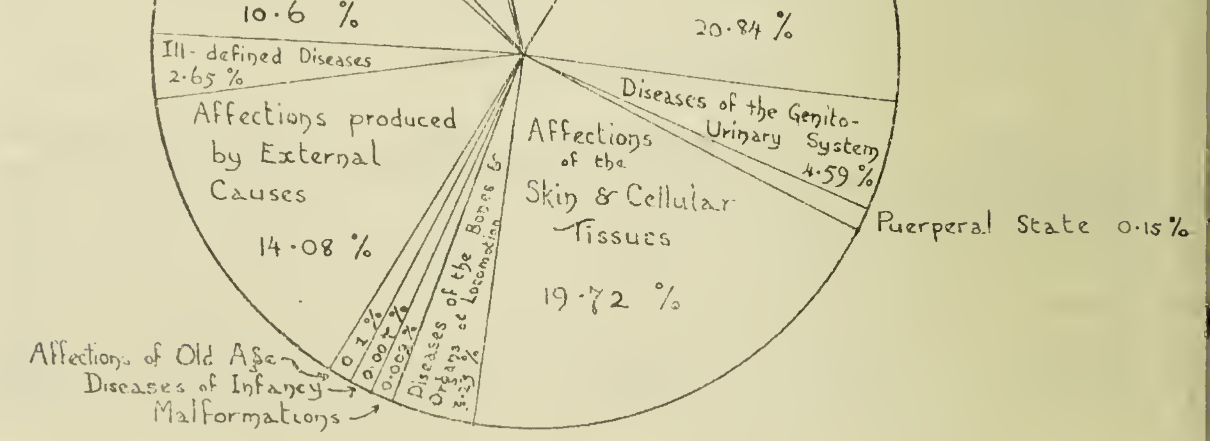


DIAGRAM II.

Showing the proportion of in-patient deaths amongst the Groups of diseases. Total in-patient deaths, 277 (2.61 per cent of all in-patients).

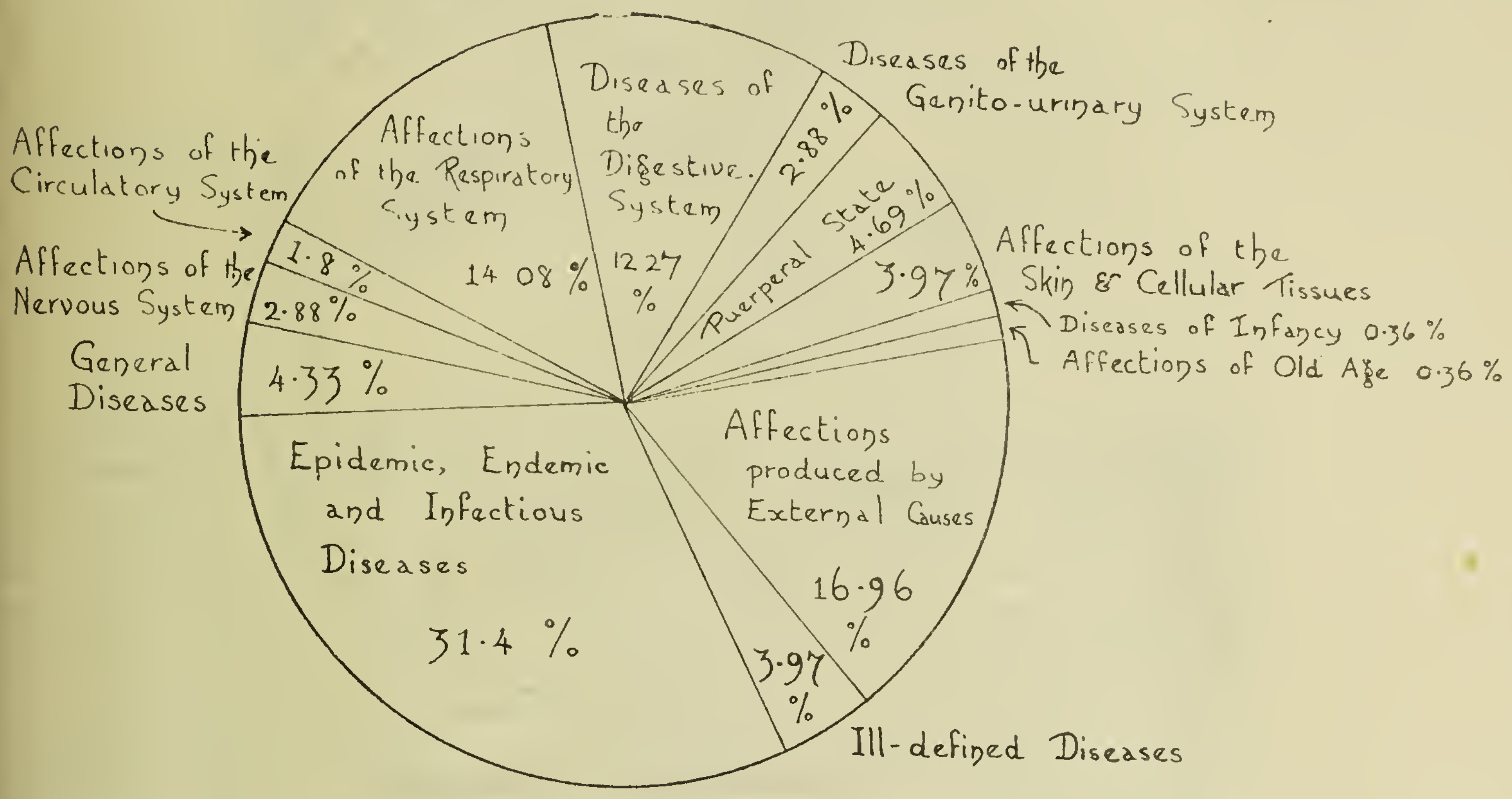


DIAGRAM III.

Showing the proportion of the diseases in Group I. treated at Government hospitals (excluding rural dipensaries).

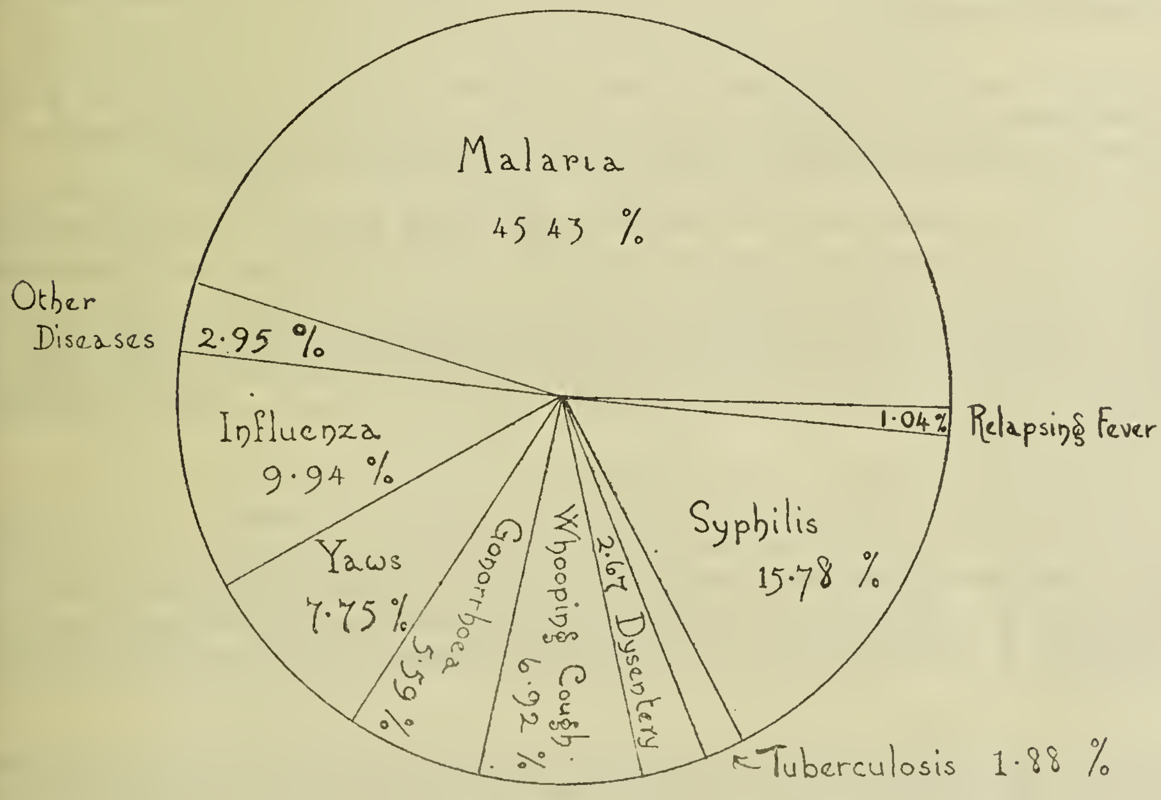
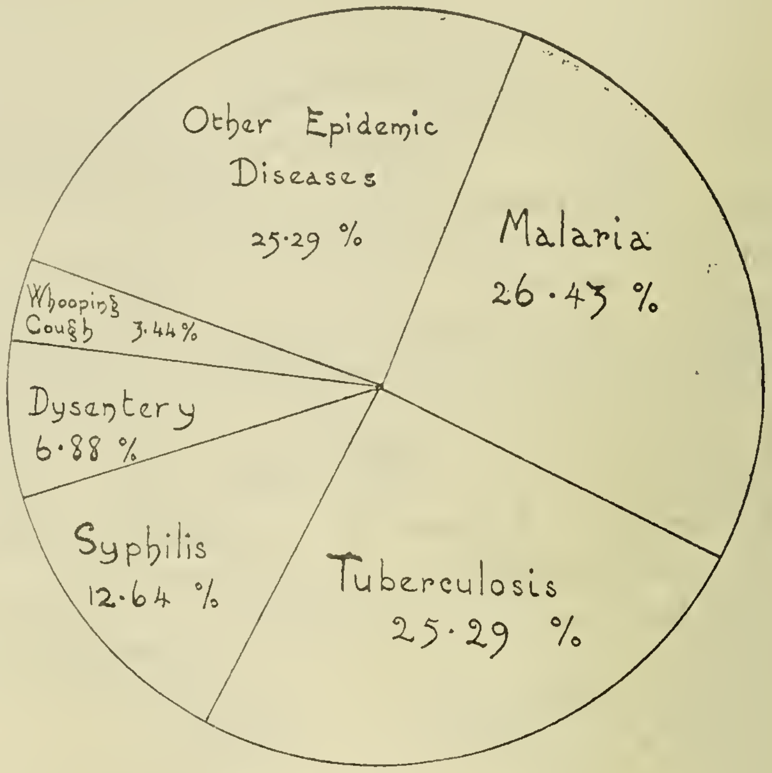


DIAGRAM IV.

Showing the proportion of deaths from diseases in Group I. occurring a Government hospitals. Total in-patient deaths due to epidemic, endemic an infectious diseases, 87.



(B) GENERAL DISEASES.

Malignant Disease and Tumours.

Forty cases of malignant disease were treated during the year, 25 male an 15 female ; 176 cases of non-malignant tumours were also reported.

Deficiency Diseases.

A total of 60 cases were reported from all parts of the country, amongs which were 48 cases of pellagra, 3 cases of scurvy. 7 cases of beriberi (actuall only 4 cases, as three of the cases owing to transfer, were reported twice) an eight cases of rickets.

Rickets

The occurrence of true rickets in Nyasaland is thought to be very rare, th cases reported were all children and from descriptions given appear to hav resembled rickets. Five cases were notified by sub assistant surgeons and tw by a hospital assistant.

Scurvy

Three cases were reported during the year. The first case was a chil admitted to the hospital at Dowa with the classical symptoms of the disease. A uneventful recovery was made under the usual dietetic treatment.

The second case occurred at the African Hospital, Zomba, in a female child of years. She exhibited well marked swellings of the distal ends of the bones o the forearm and leg, the swellings being situated just above the epiphyseal line and were symetrical in distribution. Marked anterior bowing of each tibia wa noted. The child had a considerable degree of anaemia and a mild irregula pyrexia for a short time after admission. Absolute recovery took place wit dietetic treatment.

The third case occurred at Mlanje in a child of 15 months. The typica signs and symptoms were present, subperiosteal haemorrhages in the long bone being a prominent feature. Stomatitis was far advanced on admission. Th child had been weaned 3 months previously and had then been given a unrelieved diet of native gruel. On dietetic treatment, an uneventful recover took place.

Beri-Beri

Only five cases of this disease have been reported from Nyasaland sinc 1930. Four cases occurred during the year. Three of these cases occurred i the district prison at Kota-Kota and were reported by Dr. Fitzmaurice.

The onset in the three cases referred to above was dramatically sudden, a three patients being apparently well one day and the next, almost unable t stand. They had marked pains in the legs, dyspnoea, vomiting and abdomina pain, marked tenderness over the calf muscles and thighs, foot drop and absenc of knee jerks, pulse rate 120—130 with an irritable and dilated heart; a sligh oedema was present in one case only.

The staple diet of all three patients was maize. The first two prisoners were admitted to the prison at Kota-Kota on the 30th September, 1936 and the third on 23rd November, 1936.

The prison diet was then as follows:—

Cassava flour	...	1½ lbs.	daily.
Beans	...	1 oz.	,,
Fish	...	3 ozs.	,,
Salt q.s.	...		

In November, 1936 the rations were altered to :

Cassava flour	...	¾ lb.	daily.
Maize flour	...	1 lb.	,,
Beans	...	1 oz.	,,
Fish	...	2 oz.	,,

In December, 1936 and January, 1937 no beans were available but the fish was increased to 5 oz. per head in December and reduced to 1½ oz. per head in January, 1937. Up to the 20th March, 1937 when the first case occurred, the diet was of this nature. No fresh vegetables or lemons were available, beans were difficult to get. Apart from the insufficient diet, there were other predisposing causes in the prison itself, the buildings were in poor repair and the floors very damp, bed boards were insufficient. On the 4th April, 1937 the two remaining cases occurred. The medical officer is of opinion that apart from the housing and sleeping arrangements the outbreak was probably due to the change in the staple diet, viz., maize, to a diet consisting mainly of cassava. One of the prisoners was discharged cured after an illness lasting 55 days at Kota-Kota, the other two, who were both murderers, were transferred to Zomba.

In the treatment of these cases at Kota-Kota, the medical officer employed Marmite, with 2 pints per head daily of "second day" native beer, and obtained a sufficient and adequate diet. At Zomba one of the cases on arrival had mild bilateral drop foot only, he improved rapidly on a full diet with lemons, tomatoes, etc., with the addition of an arsenical tonic. The other prisoner had well marked anaesthesia over the front of each tibia, considerable atrophy of both groups of tibial muscles, a very ataxic gait, a dilated heart and a systolic murmur. After a period of rest in bed, the condition has improved gradually. The fourth case of beriberi was reported from the Fort Johnston district. The predisposing causes were not ascertained. The patient had a pellagra-like rash, loss of power in both legs, tender muscles and loss of knee jerks. He improved rapidly under a suitable diet.

Other deficiency diseases ?

Dr. Fitzmaurice also reported an outbreak of ulcers of the leg in children in Native Authority Kasakula's section of Kota-Kota district.

Foodstuffs, both in 1936 and early in 1937 had been destroyed by locusts and consequently there was a shortage of green vegetables and vegetable protein. Children from 2-10 years were chiefly affected.

The area was left in charge of a dispenser who treated the ulcers. With the seasonal increase of foodstuffs, the position became satisfactory again in some 2½ months.

Pellagra

48 cases of Pellagra occurred during the year as compared with 33 for 1936.

The two institutions at Zomba, viz., the Central Prison and Lunatic Asylum, between them accounted for 26 of the cases. Four cases were notified from the district prison at Blantyre but all these patients had contracted the disease before admission.

Of the cases reported at the Central Prison during the year, eleven are stated to have contracted the disease after admission to the Prison, the period intervening being from 4 months to 12 years. The diet is considered to be satisfactory.

Six cases at the Central Lunatic Asylum contracted or are said to have contracted the disease in the Asylum, the intervening period varying from 7 months to 12 years.

(C) COMMUNICABLE DISEASES.

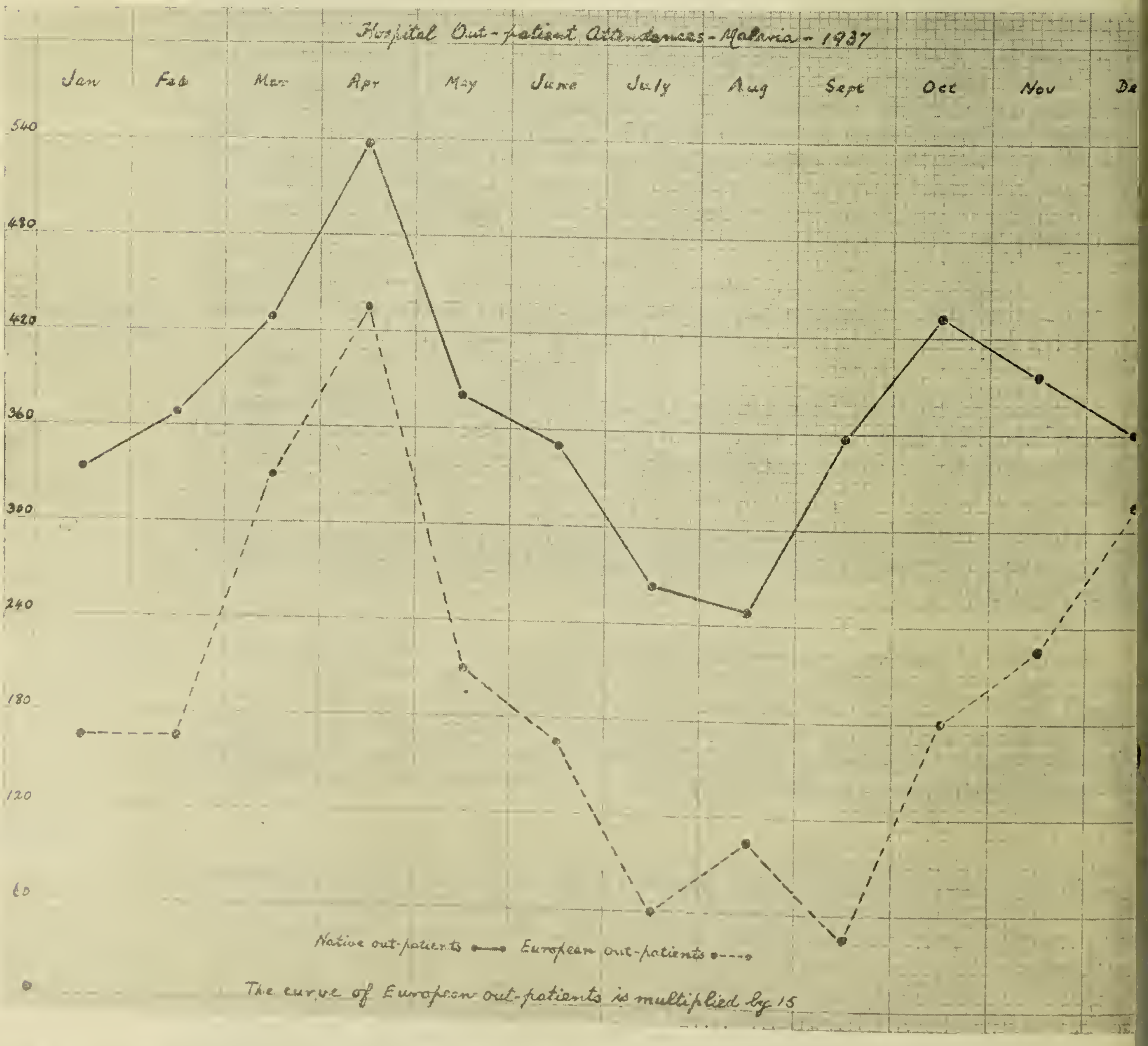
(a) Mosquito and Insect-borne diseases.

Malaria

The total number of cases reported from hospitals and rural dispensaries was 15,774, these cases were differentiated as follows:—

	Europeans	Asiatics and Africans at Hospitals	Asiatics and Africans at Dispensaries	Total
Benign tertian ...	16	281	—	297
Quartan ...	1	145	—	146
Sub-tertian ...	43	1,244	—	1,287
Cachexia ...	1	96	—	97
Blackwater ...	2	—	—	2
Undefined ...	100	4,116	9,729	13,945
			Total	15,774

The late Professor J. G. Thomson* pointed out with regard to the incidence of malaria that "the peak of the highest incidence is associated with the increased density of anophelines accompanying the annual rains". The rainy season being from November to the end of March or April, this statement is certainly borne out by examination of the number of the cases treated each month throughout the country during a full year, thus from the winter months of July and August the number of cases treated increases until the peak is reached in April when a fall sets in. The accompanying graph clearly shows the position. It will be noticed that from September the European curve rises month by month until December while the African curve after a brief rise in September and October falls in November and December; thereafter both curves rise towards the peak in April. The variation may be accounted for by the increased activity of the natives during the planting season and the consequent decrease of attendances. It is interesting to compare this graph with that prepared for Southern Rhodesia by the late Professor J. G. Thomson, (Malaria: Its investigation and Control. Knowles and Senior-White, page 56), who found almost identical conditions obtaining in that territory.



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*Malaria in Nyasaland by J. G. Thomson, M.B.,Ch.B., Proc. Roy. Soc. Med. Vol. XXVIII., page 391.

Dr. Lamborn has pointed out* that *A. costalis* is almost absent duringthe dry season, but is overwhelmingly abundant during the late rains, the other common species *A. funestus*, curiously enough, showing no numerical increase during the year; he also found the infection rate amongst *costalis* was very much higher than in *funestus*.

Treatment of malaria

Dr. Watson in his annual report for the year makes the interesting observation that a large percentage of the African cases complaining of headache, constipation and rheumatic-like pains and diagnosed as malaria by microscopical examination, may be treated by simple purgatives and rest for two or three days in bed. Occasionally, only, is quinine required and still more occasionally in anything but small dosage.

The number of cases treated during the year has been given in the table above.

Blackwater fever

From 1932 to 1936, 36 cases of Blackwater fever have been reported, of these,

16 cases were amongst Europeans;
16 cases were amongst Asiatics;
4 cases were amongst Natives.

There were nine deaths during the above period.

(b) Infectious Diseases.

Cerebro-spinal meningitis

781 cases of this disease were reported during the year with 308 deaths.

A serious epidemic occurred in the Southern Province which necessitated the initiation of special measures under the Public Health Ordinance; additional staff was seconded for the last quarter of the year to assist in controlling the outbreak. The chief difficulties encountered during the outbreak were the control of emigrant labour, the control of movement of natives from one district to another and the prevention of the congregation of natives on ceremonial occasions, such as funerals, beer drinks, etc. All schools and churches were closed, and natives were encouraged to sleep as far as possible out of doors. The epidemic is dealt with in more detail in a separate report prepared by Dr. W. T. C. Berry, Medical Officer, who was seconded for special duty. It is attached as an appendix to this report.

Relapsing fever

139 cases were reported as compared with 438 cases in 1936.

The Medical Officer, Kota-Kota, drew attention to the fact that 51 cases were treated in this district alone. Most of these cases gave a history of having slept in Government rest houses, thereby exemplifying the necessity of having these rest houses constructed of permanent materials in order that they may be, as far as possible, vermin proof.

Trypanosomiasis

Two cases only were reported as compared with six cases during 1936. Both cases were treated in the Kota-Kota district; one of these was definitely infected in the Lwangwa Valley during his return from work on the mines in Northern Rhodesia. The other was a relapse case who had contracted the disease in Northern Rhodesia and who had been treated in the Fort Jameson Native hospital; both cases survived. Owing to the occurrence of a case in the Fort Johnston district in 1936, a survey was carried out at Kasanka village which was the home of the case referred to; 352 persons were examined with negative results.

Tuberculosis

The number of cases reported during the year was 251 as compared with 246 cases for 1936.

As was mentioned in the last Annual Report, this disease is considered to be on the increase, it is not known however, even approximately what the incidence really is. Although it has been stated that the slow gradual infection of a whole population is a "sufficient guarantee against a raging and disastrous epidemic", yet as such a high proportion of adult males emigrate with a view to obtaining work in neighbouring territories and as shown by the returns of those repatriated from Southern Rhodesia, a certain proportion become infected with tuberculosis, it is necessary to keep a careful watch on the situation and to take such measures as may be possible to investigate the incidence and to control and to treat the disease.

Africans are difficult to deal with as they have not the patience to undergo prolonged rest and treatment when such is imperative, and it has proved, in practice, almost impossible to keep them in hospital for the periods necessary to treat the disease effectively. Of the vast numbers of emigrant natives who return to this country, those repatriated from Southern Rhodesia are the only ones who can be medically examined. It is interesting to observe that of a total number of 252 repatriated during the year, thirty-five were stated to have had pulmonary tuberculosis, one, tuberculosis of the vertebral column, two, tuberculosis of bones and one, tuberculosis of the lymphatic system. The 35 cases of pulmonary tuberculosis were further investigated and 12 only were found, after radiological and pathological examination, still to be suffering from tuberculosis. Before return of these cases to their homes the medical officers of the districts are duly notified.

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* Annual Medical Report, Nyasaland, 1925.

With a view to obtaining more accurate information concerning the incidence of tuberculosis, surveys were carried out at the following stations:

A. ZOMBA. 124 children under the age of 12 were examined by the dermal method using Moro's tuberculin ointment, 14 were found to be tuberculized, three of these exhibited markedly strong reactions. Eight of the 14 children showed no clinical signs of tuberculosis nor could any suspicious family history be obtained. Two children without clinical signs, had a suspicious family history. Four children exhibited tuberculous cervical glands and of these, two had suspicious family histories.

B. JEANES' SCHOOL. 96 children were examined, two gave positive results in neither child was there clinical evidence of tuberculosis. The parents were also negative on clinical examination but both the mother and father of one child gave a positive Von Pirquet reaction. One child, not examined with Moro's ointment, was found to be suffering from peritoneal tuberculosis, the father o this case gave a positive Von Pirquet reaction.

C. FORT JOHNSTON DISTRICT.

(*a*) *Malindi.* 74 children were examined with the Moro's ointment test three proved positive.

(*b*) *Kasanka's village.* 50 children were examined and 12 proved positive In both areas the progress of the children will be noted and further investigation into the family histories will be made.

With regard to the control and treatment of the disease, a scheme has bee submitted from the Mlanje district for the establishment of a village settlemen and a treatment centre. It was suggested that an abandoned estate might b used for the purpose; simple type brick huts, and a ward suitable for th treatment of such cases as required complete rest, would be erected. Familie of the infected patients would be encouraged to attend and the colony woul practice self-help as much as possible. An African hospital assistant would b placed in charge and the colony would be surpervised regularly by one of th neighbouring medical officers. The scheme has much to commend it.

Dysentery

The total number of cases reported was 1,538 as compared with 1,429 fo 1936.

At Zomba the number of European cases treated was 23 as compared wit 37 for 1936, of these 23 cases, eight at least were relapses. The incidence o this disease in Zomba shows a satisfactory decline, possibly, a result of the mor sanitary conditions now obtaining. The Medical Officer, Zomba, states that th local statistics of the disease appear to indicate, at any rate amongst Europeans that the female is more prone to the disease than the male, that she is mor difficult to treat and, in general, she suffers more severely; he suggests that a the female would appear to be more liable to chronic constipation than the male this condition may be a contributory factor.

Only 10 of the 1,538 cases reported were considered to be the bacillar type; 1,184 of the total cases were treated at rural dispensaries. A small out break (six cases) of the disease occurred during the year at the Central Lunati Asylum, Zomba. The stools of all inmates were examined for the presence o pathogenic amoebae or their cysts, but, with the exception of the six case mentioned the results were negative. Reference to records showed that th first of these cases had previously suffered from the disease, it is presume therefore, that he was the 'carrier' responsible for the outbreak.

Venereal diseases

A total of 3,324 cases were reported as compared with 2,488 for 1936. O these cases 2,377 were diagnosed as syphilis and 947 as gonorrhoea. Of th 2,377 cases of syphilis, 468 were classified as being in the primary stage. Th out-patient clinic opened at Blantyre in 1936 continued to function with fai success. The subsequent attendances were unsatisfactory, for example, 27 adults attended for the first time but only 377 subsequent attendances wer registered. However, during the year, a native nurse was posted to the clini and 145 female patients paid a first visit. As venereal diseases are commonl said to be on the increase, it is interesting to note that out of 1,435 labourer examined at Dedza only 28 were rejected on account of venereal disease. A Mlanje, on the other hand, the medical officer states that, in his opinio venereal disease is on the increase; 91 cases of syphilis were treated during th year and 14 cases of gonorrhoea, but no cases of stricture were seen and the appeared to be no arthritic or cardiac complications.

Manifestations of tertiary syphilis are said to be rare in the African, but case is reported from the African Hospital, Zomba, of a native with a year history of painless perforation of the soft palate and ulcers of the neck an chest. The ulcers were situated over the left sterno-mastoid and over the 7t and 8th ribs on the left side. The appearance of the scar tissue and the site of the lesions, both especially common as the seat of gummata, left no doubt a to the syphilitic origin of the lesions.

Helminthic diseases

The total number of cases treated was 22,463 as compared with 19,305 for 1936.

At the labour examinations conducted during 1936 and part of 1937 a number of otherwise apparently healthy individuals were rejected on account of urinary bilharziasis. Later on, at the express desire of the Witwatersrand Native Labour Association such individuals were passed fit for work.

One of the examining medical officers reported that in a large percentage of such cases no history suggestive of infection with bilharzia could be obtained and it was only upon urine examination that infection was disclosed. In the Fort Johnston district the medical officer compares the results of two small village surveys and suggests that with regard to Namwera's the lighter rate of infection may be attributed to the presence of a dispensary and to the partial latrinization of the village, the percentages were:—

	Namwera	Kasanka
Ankylostomiasis	23% ...	56%
Schistosomiasis	29% ...	80%

With regard to the treatment of ankylostomiasis, the medical officer at the African Hospital, Zomba, remarks that the removal of the worms alone has little effect on the anaemia of the disease and the statement that iron corrects the anaemia whilst the worms are still in the body (Lancet, 1934, ii. 299) has been verified. It would seem that the presence of the parasites in the gut may interfere with the absorption of iron from the intestinal canal. The presence of bile pigment would appear to be necessary (American Journal of Medical Science, 1934, August, 206) for the proper absorption of iron in the treatment of the common hypochromic anaemias and it is possible that the presence of large numbers of hookworms in the upper parts of the intestines may obstruct or otherwise render valueless, the normal flow of bile. The administration of cholagogues to a percentage of patients receiving treatment for anaemia, and at the same time suffering from untreated ankylostomiasis, resulted in the quicker return to a normal blood state than was observed in control cases receiving iron only.

The Medical Officer, Lilongwe, from his experience in Nyasaland makes a comparative table of the incidence of the three principal helminthic infections in three different parts of the Protectorate.

	Karonga	Mlanje	Lilongwe
Altitude (feet) ...	1,800 ...	2,400 ...	3,400
Annual rainfall (inches) ...	40-50 ...	75-80 ...	30-40
Climate	Warm and humid	Warm and very humid	Warm and dry
Incidence of *S. haematobium* ...	Medium ...	Heavy ...	Medium
Incidence of ascariasis ...	Light ...	,, ...	Light
Incidence of ankylostomiasis ...	Heavy ...	Medium ...	Medium
Incidence of *S. mansoni* ...	,, ...	Light ...	,,

Small-pox

90 cases were reported during the year; no epidemic occurred.

The usual table showing the number of vaccinations, etc., carried out is inserted below:—

VACCINATION RETURN FOR THE YEAR 1937.

No.	Name of District	Successful	Modified	Unsuccessful	Not seen	Total
1.	Blantyre ...	3,649 ...	628	... 1,230 ...	1,024	6,531
2.	Chikwawa ...	8,029 ...	881	... 1,923 ...	721 ...	11,554
3.	Chinteche ...	4,057 ...	1,661	... 1,040 ...	476 ...	7,234
4.	Chiradzulu ...	1,299 ...	787	... 649 ...	575 ...	3,310
5.	Cholo ...	8,016 ...	3,895	... 1,320 ...	— ...	13,231
6.	Dedza ...	5,511 ...	1,817	... 845 ...	141 ...	8,314
7.	Dowa ...	2,518 ...	301	... 824 ...	68 ...	3,711
8.	Ft. Johnston ...	3,068 ...	12	... 461 ...	416 ...	3,957
9.	Ft. Manning ...	3,193 ...	1,821	... 1,056 ...	— ...	6,070
10.	Karonga ...	8,597 ...	996	... 777 ...	— ...	10,370
11.	Kasungu ...	1,296 ...	234	... 616 ...	147 ...	2,293
12.	Kota-Kota ...	2,824 ...	1,780	... 1,597 ...	— ...	6,201
13.	Lilongwe ...	4,497 ...	887	... 389 ...	122 ...	5,895
14.	Liwonde ...	1,707 ...	—	... 1,481 ...	— ...	3,188
15.	Mlanje ...	15,109 ...	8,586	... 2,712 ...	20,526 ...	46,933
16.	Mzimba ...	5,635 ...	1,053	... 2,190 ...	603 ...	9,481
17.	Ncheu ...	6,664 ...	1,560	... 1,460 ...	762 ...	10,446
18.	Port Herald ...	8,758 ...	3,539	... 1,860 ...	1,662 ...	15,819
19.	Zomba ...	374 ...	141	... 58 ...	51 ...	624
	TOTAL ...	94,801 ...	30,579	... 22,488 ...	27,294 ...	175,162

Leprosy

The treatment of this disease in Nyasaland is carried out almost entirely by the missions.

There are 12 clinics established throughout the country, the accommodation provided varies considerably and ranges from the ordinary mud and wattle hut to well built brick structures.

Some of these leper centres are run on the lines of a village settlement others are arranged in an orderly manner in a compound with the treatment centre as the main feature.

The majority of the centres are in charge of qualified nurses, a few have the advantage of possessing a resident doctor. The total number of lepers under treatment at mission centres in 1936 was 646 approximately. It is not known to what extent the disease is prevalent in Nyasaland, but it should be possible to obtain more accurate information at the next census. The majority of the leper centres are provided with ground for the cultivation of food crops and such lepers as are able work in the fields. The native attendants are frequently lepers themselves. Practically all missions provide some educational facilities for their patients. At one of the centres, lepers had to be turned away during the year, owing to the accommodation being limited and to paucity of funds. At the present time Government grants an annual subsidy of £900 a year for the treatment of leprosy, this sum is distributed amongst the various missions in proportion to the number of lepers under treatment. Applications have been received from missions for increased grants but, the financial situation has rendered any extension of this work, so far as Government is concerned, impracticable. Drugs and dressings used for the treatment of leprosy are supplied free of cost.

The following table shows the average number of lepers under treatment etc., at the various centres during 1937 :—

Name of Centre	Average number of resident patients		Admissions		Discharges		Deaths	
	M	F	M	F	M	F	M	F
Bandawe	28.25	37.25	2	1	—	—	1	—
Domasi *	9.50	4.00	2	1	—	—	1	—
Likoma	5.50	8.00	—	—	—	—	1	[illegible]
Likwenu	50.25	10.75	11	6	5	2	—	—
Livingstonia	4.00	3.50	—	—	—	—	1	—
Loudon	12.00	8.00	7	5	—	—	2	—
Malamulo	170.25	63.00	96	41	45	17	13	[illegible]
Malindi	17.00	12.75	3	3	—	—	1	[illegible]
Mkhoma	3.50	3.25	1	—	—	2	—	—
Mua	34.00	29.00	5	8	5	3	1	[illegible]
Mwami	28.25	16.00	3	8	1	—	1	—
Utale	83.00	48.00	33	24	10	6	4	—

(D) VITAL STATISTICS.

(I) General African Population.

Vital statistics Fort Manning district

Fort Manning continues to be the only administrative district in which records of births and deaths for the whole area were collected throughout the year. The last census was taken in the Protectorate towards the end of April 1931, on that occasion the population of Fort Manning district was returned at 34,105. The census due in 1936 was postponed on the grounds of economy accurate figures relating to the population and its age and sex distribution are therefore not available. It is generally agreed that a large number of young male adults have emigrated from this district in recent years. The actual figure is not known but it is believed to equal the natural increase of population. In view of the possibility that other districts may be losing young male adults to the same extent, it would appear desirable to have a census taken previous to 1941 in order that measures to control emigration may be introduced, in the event of the figures indicating that excessive loss is occurring. The natural increase of population of this district has amounted to 5,472 during the 5 years these records have been maintained, though, for the purpose of calculating the various rates the mid-year population has generally been estimated at approximately 35,000. It is possible that the birth and death rates may require to be revised when the next census figures become available.

During the past three years the various rates have been as follows :—

	1935	1936	1937
Birth rate	52.9	46.8	49.4
Death rate	21.2	21.8	22.8
Infantile mortality rate	73.4	82.3	61.9
Still-birth rate	96.0	87.0	63.3

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* Centre closed on 7th August, 1937, and all inmates discharged to their villages.

Although the birth rate is slightly higher than that recorded last year, it is considerably below the rate for 1935 which was estimated on a mid-year population of 36,000. As in former years there was an excess of female over male births; in 1935, 1936 and 1937, the ratio of male per 1000 female live births was 938, 933 and 973 respectively. The crude death rate has not altered appreciably. Once again there was an excess of female over male deaths at all ages, most marked in the adult group. Twenty-two deaths were attributed to the "puerperal state" giving a maternal mortality of 12.8 per 1000 live births or 11.6 per 1000 total births. The infantile mortality rate is the lowest returned since the collection of records commenced in this district, and, in view of the risks to infant life in a primitive community it is suspected that the returns upon which the rate is based, are far from complete.

Vital statistics North Nyasa district

The collection of records of births and deaths throughout this district had to be abandoned in 1936. During 1937, the recording of births anddeaths was restricted to twenty-four villages with a population of 4,757 adults and children, situated within a 5 mile radius of the town of Karonga, which is the administrative and medical headquarters of the district. The Section A. rates published in the 1935 Annual Medical Report were calculated on the records of births and deaths occurring in a population of 19,000 which included the inhabitants living within the radius of the present area of collection. The following rates have been calculated from the returns submitted during the year :—

Birth rate	42.4	per	1000	population.
Death rate	28.5	,,	,,	,,
Infantile mortality rate	272.2	,,	,,	live births.
Still-birth rate	123.7	,,	,,	,, ,,

Vital statistics West Nyasa district

In September 1936, three Native Authorities of the West Nyasa district requested permission to make an order under section 8 (k) Cap.41 (Native Authority Ordinance) Laws of Nyasaland, to provide for the registration of births and deaths in their respective areas. The order was introduced on 1st July 1937 and remained in force until the end of the year. It was necessary to employ clerks who spent their whole time travelling from village to village collecting the returns and financial considerations will not allow this pioneer effort on the part of these Native Authorities to be continued in 1938.

The District Commissioner, Chinteche, has encouraged this attempt to collect vital statistics relating to his district and I am indebted to him for the following report of the results obtained. In his covering letter which accompanied the statistics, this officer states:

> "With regard to these figures it is pointed out that the population has probably undergone considerable changes since the last census taken in 1931. Nevertheless it is considered that certain interesting deductions may be drawn from these statistics. The great prevalence of venereal disease in the Lake shore areas as compared with the hill country which is more free from it may account for the enormous difference shown in the birth rate of the natives of Native Authority Kabunduli as compared with those of Native Authority Mbwana and the Atonga Tribal Council."

WEST NYASA DISTRICT.

POPULATION ACCORDING TO 1931 CENSUS.

Males. 22,814 Females. 26,249 Total 49,063.

BIRTHS FROM 1ST JULY, 1937 — 31ST DECEMBER, 1937.

Males. 468 Females. 480 Total. 948.

Birth rate per 1000 per year 38.6.

DEATHS FROM 1ST JULY, 1937 — 31ST DECEMBER, 1937.

	Males.	Females.
Under 5 years	66	89
5 — 15 years	36	34
16 — 50 years	43	83
Aged	34	47
	179	253

TOTAL 432.

Death rate per 1000 per year 17.6.

NATIVE AUTHORITY MBWANA.

POPULATION ACCORDING TO 1931 CENSUS.

Males. 4,481 Females. 5,118 Total. 9,599.

BIRTHS FROM 1ST JULY, 1937 — 31ST DECEMBER, 1937.

Males. 112. Females. 117. Total. 229.

Birth rate per 1000 per year 47.7.

DEATHS FROM 1ST JULY, 1937 — 31ST DECEMBER, 1937.

	Males.	Females.
Under 5 years	15	19
5 — 15 years	0	4
16 — 50 years	4	11
Aged	5	9
	24	43

Total 67.

Death rate per 1000 per year 14.0.

NATIVE AUTHORITY KABUNDULI.

POPULATION ACCORDING TO 1931 CENSUS.

Males. 2,626 Females. 2,872 Total. 5,498.

BIRTHS FROM 1ST JULY, 1937 — 31ST DECEMBER, 1937.

Males. 135. Females. 102. Total. 237.

Birth rate per 1000 per year 86.2.

DEATHS FROM 1ST JULY, 1937 — 31ST DECEMBER, 1937.

	Males.	Females.
Under 5 years	5	7
5 — 15 years	10	14
16 — 50 years	7	17
Aged	4	10
	26	48

TOTAL 74.

Death rate per 1000 per year 26.9.

ATONGA TRIBAL COUNCIL.

POPULATION ACCORDING TO 1931 CENSUS.

Males. 15,707 Females. 18,259 Total. 33,966.

BIRTHS FROM 1ST JULY, 1937 — 31ST DECEMBER, 1937.

Males. 221 Females. 261 Total. 482.

Birth rate per 1000 per year 28.4.

DEATHS FROM 1ST JULY, 1937 — 31ST DECEMBER, 1937.

	Males.	Females.
Under 5 years	46	63
5 — 15 years	26	16
16 — 50 years	32	55
Aged	25	28
	129	162

TOTAL 291.

Death rate per 1000 per year 17.1.

Although rates calculated on the population of the district in 1931 and for only a part of one year must be regarded as of little statistical value, the total figures are not devoid of interest. There is an excess of female over male births and an excess of female over male deaths, results identical with those obtained year after year from Fort Manning district.

The collection of statistics as a departmental experiment

Registration of births and deaths is not compulsory in this country and with the exception of the isolated effort in the Chinteche area referred to above, official recognition, so far as vital statistics of Africans are concerned, has been given to the census enumeration only. The collection of returns of births and deaths during the past five years has been a departmental experiment and as such has been applied merely to a limited area. As an experimental endeavour to obtain statistics relating to a primitive people, it has been successful, but, being restricted in its application to only one complete administrative district the results are of little or no departmental value. Unless there is some prospect of compulsory registration being introduced for the whole country there would appear to be no object in prolonging an interesting though valueless experiment.

Vital statistics are a measuring rod of the sanitary progress of a country, they have become an essential for every properly organised community. The Statistics Ordinance, 1935, provided for the collection of information relating to births and deaths and in "Indirect Rule" there is the mechanism capable of ensuring its successful application throughout the Protectorate. It is recommended that compulsory registration of births and deaths should be introduced without further delay. Despite legal support, it will not be possible to depend on the accurancy of the records for some years and it is desirable to ensure that the scheme will be functioning efficiently before the date of the next census.

(II) Asiatics.

There was a further slight increase in the Asiatic population from 1,558 in 1936 to 1,631 in 1937.

During the year there were 83 births and 19 deaths; the causes of death were as follows:—

	Male		Female	
	Adults	Infants	Adults	Infants
Malaria	2	2	—	—
Dysentery—undefined	—	1	1	—
Leprosy	1	—	—	—
Cerebro-spinal fever	—	—	1	—
Pulmonary tuberculosis	1	—	—	—
Acute endocarditis	1	—	—	—
Pneumonia	1	1	1	—
Ludwig's angina	1	—	—	—
"Stomatitis"	1	—	—	—
Peritonitis	1	—	—	—
"Childbirth"	—	—	1	—
Gangrene	1	—	—	—
Suicide by strangulation	1	—	—	—
Total	11	4	4	—

(III) European General Population.

Th European population was estimated at 1,894 an increase of 56 as compared with last year.

During the year 29 births and 18 deaths were recorded; the causes of death were as follow:—

	Male		Female	
	Adults	Infants	Adults	Infants
Malaria	1	—	—	—
Blackwater fever	—	—	2	—
Diphtheria	—	1	—	—
Pulmonary tuberculosis	—	—	1	—
Cancer of the intestine	1	—	—	—
Broncho-pneumonia	1	—	—	—
Pneumonia	1	—	—	—
Inflammation of stomach	—	1	—	—
Appendicitis	1	—	—	—
Peritonitis	1	—	—	—
Prematurity	—	—	—	2
Asphyxia	—	1	—	—
Senility	1	—	1	—
Suicide by firearms	1	—	—	—
Injuries inflicted by animals	1	—	—	—
Total	9	3	4	2

(IV) European Officials.

The following table shows the sick, invaliding and death rates of the European officials :—

	1934	1935	1936	1937
Total number of officials resident	276	266	269	279
Average number resident	205.7	205.3	205.7	225.2
Total number on sick list	125	113	93	107
Total number of days on sick list	1,708	1,781	2,018	1,168
Average daily number on sick list	4.68	4.88	5.51	3.2
Percentage of sick to average number resident	1.66	2.36	2.18	1.42
Average number of days on sick list	13.66	15.6	21.7	10.9
Average sick time to each resident (days)	9.3	8.77	9.79	5.18
Total number invalided	7	6	4	5
Percentage of invaliding to total residents	2.53	2.25	1.86	1.78
Total deaths	0	0	1	1
Percentage of deaths to total residents	0	0	0.4	0.39

The causes of invaliding were :—

1. Chronic amoebic dysentery and neurasthenia.
2. Fibrosis of lungs.
3. Suspected tuberculosis.
4. Disability of wrist.
5. Neurasthenia.

(V) Native Officials and Native Troops.

The Native officials numbered 2,752 as compared with 2,603 in 1936. The term 'native official' includes police and native troops, but excludes casual labour in receipt of less than ten shillings a month. The prevailing disabilities and the number of days off duty are compared below with those of previous years.

	1935		1936		1937	
	No. of cases	No. of days off duty	No. of cases	No. of days off duty	No. of cases	No. of days off duty
Malaria	120	697	158	1,033	169	930
Influenza	35	184	85	392	51	204
Injuries	101	1,499	55	523	73	713
Respiratory affections	79	697	60	592	52	343
Dysentery	42	417	30	314	73	527
Venereal diseases	60	1,463	69	2,022	49	1,119

The causes of death were :—

Cerebral tumour
Schistosomiasis
Influenza
Cirrhosis of liver (Bilharzial)
Cerebral aneurysm
Meningitis
Relapsing fever
Lobar pneumonia
Cancer of the bladder
Pleurisy
Haematemesis
Intestinal obstruction

The following table shows the sick, invaliding and death rates of Native officials :—

	1935	1936	1937
Total number of native officials	2,457	2,603	2,752
Total number on sick list	933	1,129	906
Total number of days on sick list	10,427	11,880	8,135
Average daily number on sick list	28.50	32.54	22.28
Percentage of sick to total number of officials	1.12	1.25	0.81
Average sick time to each patient (days)	11.20	10.52	8.97
Total number of deaths	17	9	12
Percentage of deaths amongst native officials	0.65	0.34	0.44

SECTION III. HYGIENE AND SANITATION.

A. GENERAL REVIEW OF WORK DONE AND PROGRESS MADE.

Deficiency of Sanitary staff

It must be admitted that the lack of trained sanitary staff, European and African, tends to retard progress and in some instances to render individual effort ineffective. For example, a certain area may be selected for rural development, the headman is shown the advantages of a clean village and the value of latrine pits, etc., and is persuaded to take the necessary measures to improve the insanitary conditions. If this area is not continually watched and visited, it will almost certainly lapse and revert to its former unhygienic condition. Now, one medical officer with perhaps one African sanitary inspector and two or three vaccinators and with a native population of anything from 80,000 to 120,000 cannot afford the time to visit any one area, unless it be situated in his immediate vicinity, so frequently as to ensure continuity of any sanitary schemes undertaken. So that, unless a really enlightened Native Authority or a headman possessing courage and initiative is met with, any programme of rural development is almost certainly doomed to failure. On the other hand certain recent departmental developments have had, it is considered, a definite influence in raising the sanitary standard of living in some of the rural areas, amongst these new activities the following may be mentioned:

(*a*) The medical surveys, which were instituted some three years ago and had two definite objects in view, (*i*) to bring the medical officer into closer contact with village life, and (*ii*) to obtain, by the actual examination of the inhabitants of selected areas, a knowledge of the morbidity of the district. These objects have, to some extent, been achieved.

(*b*) School inspections. As mentioned later on in this report it was intended that in each district a native school, preferably a boarding school, should be visited and its pupils medically examined, each year. Lack of staff has not permitted these proposals to materialize, but during the year, 731 school children were examined as compared with 598 in 1936.

(*c*) Inspections of labour conditions on private estates. These visits have undoubtedly in some cases stimulated employers of labour to erect better houses, to undertake anti-malarial measures and to improve generally, labour conditions.

(*d*) The opening of an infant welfare clinic at the African Hospital, Zomba, and its expansion to villages in the near vicinity which are visited regularly by the health sister, has already resulted in increased attendances of both women and children at the hospital, the women seeking advice and treatment for other complaints and ailments in addition to those particularly connected with pregnancy and its *sequelae*.

Extracts from district reports

The following extracts taken at random from medical officers' annual reports reveal a gradual improvement in hygiene and sanitation in rural areas.

> *Fort Johnston.* "During the year, however, a determined effort was made to commence the important task of rendering the natives really used to the idea of latrines as part of their ordinary life and not a meaningless ritual forced upon them. Last year a survey was made in the largest village in the district, Mponda's, which revealed a complete lack of sanitation and an exceedingly high incidence of helminthic disease. Following this, explanatory talks on sanitation were given to the principal headmen and elders, till the Native Authority definitely expressed a desire to have his village made sanitary. A rural sanitary inspector was therefore stationed at the village for several months with the latrine boring machine. The idea aimed at was to have finally a latrine for every hut, so that each householder would be responsible for the maintenance of his own latrine, instead of communal latrines for which everyone would try to evade responsibility. No labour was provided on the principle that natives appreciate much more something they have done for themselves than anything given to them, so for constructional purposes the huts were divided into groups of four, which meant that no one helped to dig more than four latrines. No compulsion of any sort was used and explanatory talks were given to those who said they did not want latrines. Many inhabitants were so impatient to have latrines that they dug their own without waiting for the machine to reach them. So far, nearly 200 latrines are in use and construction is still going on".
>
> *Dedza.* "The degree to which advice has been followed with regard to sanitary matters varies in direct proportion to the character and capability of the Native Authority concerned. Kachindamoto's area is the most satisfactory. Four of the others have not even bothered to acknowledge the receipt of my circular. Everywhere the plea of lack of labour owing to the emigration of the male population is the excuse put forward.
>
> A mass hookworm campaign was carried out at Lizulu village during the year. Specimens of hookworm and round worm were brought out and passed around for all to see. A lecture was given which explained as simply as possible the nature, the cause and the preventive measures to be adopted against hookworm. This propaganda meeting was attended by some three hundred natives, many having come in from villages in Portuguese East Africa".

Dowa. "Mention may be made of one village, Sendeza in Dzoole Section, where some sanitary work has been done. The village headman is helpful and the local school teacher helps him. The village has been cleared of all bush, rubbish pits made, new houses properly constructed and latrinization is complete".

Kota-Kota. "Vaccinators have done good work in rural sanitation. The increasing production of cotton in Native Authority Mwadzama's Section is assisting greatly in keeping the tsetse fly out of villages. Helminthic diseases: it is impossible to control the bathing activities, but the rising of the Lake has forced many villagers to move to healthier sites. There is, in my opinion, no doubt that rural village sanitation could be made a success if there was an efficient sanitary inspector in each Section".

Sanitary measures in Townships

With regard to the large Townships, progress in sanitary matters has been made and it is satisfactory to report that the scheme for supplying water closets to all Government houses in Zomba has been completed and that the majority of the offices will be similarly equipped in a short time. Efforts should now be made by the authorities concerned in these townships to take over, to some extent, the financial burden of the European sanitary staff.

(I) Preventive Measures.

Malaria

The incidence of malaria in the group of epidemic, endemic and infectious diseases was 45.48 per cent as compared with 35.93 per cent for 1936. The usual anti-malarial methods were employed with success in the larger townships, which, except during certain times of the year when invaded by wind borne mosquitoes, usually culicines, are remarkably free from these insects.

In the outstations canalisation of streams and other measures are being employed. At Kota-Kota, a considerable amount of this type of work has been accomplished in the actual village of Kota-Kota which has a population of some 5,000, these works being of a permanent nature, are of considerable value. At Fort Johnston, considerable strides have been made in clearing the banks of the river of all rushes and bush, the result has been well worth while and the mosquito nuisance has been abated to a large extent.

Jeanes Training Centre.

A trained mosquito searcher was posted to this institution during the year and the most prolific breeding places in rock pools and water pockets along the Domasi river were dealt with, chiefly by cement work.

At first, the house catches were at the rate of 13 per house daily (55% Anophelines) but the introduction of anti-malarial measures reduced this rate in four months to an average of 2 per house per day. The work was carried out during the months—May to September—when the proportion of Anophelines to other species is at its highest.

Mlanje District.

The medical officer remarks that on an estate where anti-malarial measures are being carried out by extensive drainage and oiling measures, the cultivation of land for tea has had also a marked effect in draining what were formerly swampy areas, and in situations where housing for labour is more or less surrounded by a large area of tea bushes, very few breeding places of moquitoes are found.

(II) General Measures of Sanitation.

Medical Surveys.

The physical state and sanitary environment of the rural population were investigated in a number of districts during the year under review.

The ultimate achievement, namely, a minimum of two medical surveys in each of the twenty administrative districts of the Protectorate has not yet been realised; shortage of staff, changes in personnel, the occurrence of epidemics and the difficulties usually experienced when dealing with communities unaccustomed to the routine of a survey, all assisted in curtailing the programme.

The results of surveys performed in the districts of Cholo, Dedza, South Nyasa, North Nyasa, Kota-Kota, Upper Shire and Mlanje are summarised in the following tables; surveys were attempted in three other districts but the information obtained was incomplete and not worthy of publication. The report of a survey conducted at the Jeanes Training Centre, Zomba district, is submitted separately as it deals with members of a community composed of representatives from many districts.

In each of three districts, namely, Dedza, South Nyasa and Kota-Kota it was possible to undertake two surveys, one among villagers residing at Lake level and the other among communities located at an altitude of over 3,000 feet;

thus, it is possible to contrast the results obtained from people living within the same administrative district but under different climatic conditions. Only one survey was carried out in Cholo district and although the group of villages concerned is situated at an altitude of 3,600 feet, the results indicate that the conditions obtaining resemble more closely those prevailing at Lake level.

The original classification of individuals into three age-groups has been retained and the summarised results of the laboratory and physical examinations are tabulated under the headings: "High altitude" and "Low altitude," to indicate that the areas where the surveys were performed, are situated above or below an altitude of 3,000 feet.

The following tables indicate the extent to which the general native population suffers from malaria, urinary schistosomiasis and intestinal parasites, and the effect of these conditions on the spleen and on the haemoglobin content.

HIGH ALTITUDE.

Haemoglobin estimations.

	Total No. estimated First age-group, 58.			Total No. estimated Second age-group, 198.			Total No. estimated Third age-group, 276.		
	Dedza	South Nyasa	Kota-Kota	Dedza	South Nyasa	Kota-Kota	Dedza	South Nyasa	Kota-Kota
No. examined. Males	4	20	6	13	57	22	42	53	10
Average %Hb	56	55	70	70	60	77	74	63	78
No. examined. Females	5	19	4	11	62	33	45	121	5
Average %Hb	60	53	71	66	65	76	67	61	78

LOW ALTITUDE.

Haemoglobin estimations.

	Total No. estimated First age-group, 285.						Total No. estimated Second age-group, 601.						Total No. estimated Third age-group, 1,005.					
	Dedza	South Nyasa	Kota-Kota	North Nyasa	Upper Shire	Mlanje	Dedza	South Nyasa	Kota-Kota	North Nyasa	Upper Shire	Mlanje	Dedza	South Nyasa	Kota-Kota	North Nyasa	Upper Shire	Mlanje
No. examined. Males	7	17	11	50	29	14	20	66	49	50	99	38	233	65	—	50	33	29
Average %Hb ...	56	49	52	53	74	51	70	56	60	64	86	66	74	57	—	72	81	77
No. examined. Females	17	26	8	50	37	19	12	59	34	50	75	49	308	119	—	50	27	91
Average %Hb ...	60	61	56	54	70	45	64	59	61	64	79	63	67	55	—	69	74	73

HIGH ALTITUDE.

Summary of urine examinations.

	Number examined First age-group, 58.				Number examined Second age-group, 327.				Number examined Third age-group, 411.			
	Dedza	South Nyasa	Kota-Kota	Cholo	Dedza	South Nyasa	Kota-Kota	Cholo	Dedza	South Nyasa	Kota-Kota	Cholo
Number examined per district	9	39	10	—	24	119	55	129	87	174	15	135
Number positive: *S. haematobium*	—	10	—	—	—	37	4	12	—	48	3	29
Percentage positive—approx.	—	25	—	—	—	31	7	9	—	27	20	21

Low Altitude.

Summary of urine examinations.

	Number examined First age-group, 131.						Number examined Second age-group, 479.						Number examined Third age-group, 885.					
	Dedza	South Nyasa	Kota-Kota	North Nyasa	Upper Shire	Mlanje	Dedza	South Nyasa	Kota-Kota	North Nyasa	Upper Shire	Mlanje	Dedza	South Nyasa	Kota-Kota	North Nyasa	Upper Shire	Mlanje
Number examined per district ...	24	43	19	—	12	33	32	125	66	100	69	87	541	184	—	100	31	29
Number positive: *S. haematobium* ...	—	37	1	—	3	19	3	101	17	39	53	75	3	146	—	30	14	22
Percentage positive —approx. ...	—	86	5	—	41	37	9	80	25	39	76	86	6	73	—	30	45	75

High Altitude.

Blood Films.

	Number examined First age-group, 104.				Number examined Second age-group, 327.				Number examined Third age-group, 411.			
	Dedza	South Nyasa	Kota-Kota	Cholo	Dedza	South Nyasa	Kota-Kota	Cholo	Dedza	South Nyasa	Kota Kota	Cholo
Number examined per district	9	39	10	46	24	119	55	129	87	174	15	13
Number positive:												
Malaria undefined	—	—	2	—	—	—	3	—	—	—	—	—
P. falciparum	5	15	—	18	9	35	—	75	31	43	7	4
P. vivax	—	—	—	—	—	2	—	—	—	4	—	—
P. malariae	—	—	1	—	—	13	5	3	—	7	2	—
Gametocycles: Type not defined	—	5	—	2	—	13	1	4	—	8	2	
Percentage positive—approx.	55	37	30	39	37	42	14	60	35	31	60	3

Low Altitude.

Blood Films.

	Number examined First age-group, 285.						Number examined Second age-group, 601.						Number examined Third age-group, 1,005.					
	Dedza	South Nyasa	Kota-Kota	North Nyasa	Upper Shire	Mlanje	Dedza	South Nyasa	Kota-Kota	North Nyasa	Upper Shire	Mlanje	Dedza	South Nyasa	Kota-Kota	North Nyasa	Upper Shire	Mlanje
Number examined per district ...	24	43	19	100	66	33	32	125	83	100	174	87	541	184	—	100	60	12
Number positive:																		
Malaria undefined	—	—	4	50	—	—	—	—	23	—	—	—	—	—	—	28	—	—
P. falciparum ...	5	6	2	14	42	15	7	23	8	17	76	44	166	10	—	18	27	6
P. vivax ...	—	3	2	11	3	7	—	10	2	12	—	20	3	7	—	10	—	1
P. malariae ...	5	6	5	5	4	3	—	18	10	9	2	3	20	6	—	11	1	—
Multiple infections	—	—	2	—	—	1	—	—	3	—	—	—	—	—	—	—	—	—
Gametocytes: Type not defined ...	2	6	3	5	3	—	3	23	7	—	3	2	13	14	—	—	2	
Percentage positive—approx. ...	41	35	79	80	74	79	22	41	55	58	45	78	35	12	—	67	46	

HIGH ALTITUDE.

Summary of spleen examinations.

	Number examined First age-group, 104.				Number examined Second age-group, 327.			
	Dedza	South Nyasa	Kota-Kota	Cholo	Dedza	South Nyasa	Kota-Kota	Cholo
pleen—palpable	—	—	2	13	—	1	—	35
,, enlarged one finger	—	7	—	7	1	21	—	7
,, enlarged two fingers	2	8	—	21	4	28	1	54
,, enlarged three fingers ...	—	7	—	2	2	21	1	25
,, enlarged to umbilicus ...	—	—	—	1	2	—	—	4
umber examined	9	39	10	46	24	119	55	129
pleen rate—approx %	22	56	20	95	37	60	4	97

LOW ALTITUDE.

Summary of spleen examinations.

	Number examined First age-group, 285.						Number examined Second age-group, 601.					
	Dedza	South Nyasa	Kota-Kota	North Nyasa	Upper Shire	Mlanje	Dedza	South Nyasa	Kota-Kota	North Nyasa	Upper Shire	Mlanje
Spleen—palpable	—	—	7	2	3	14	1	—	21	—	24	18
,, enlarged one finger ...	—	3	—	17	9	5	2	11	6	19	40	11
,, enlarged two fingers ...	10	11	4	25	21	2	3	30	13	20	33	11
,, enlarged three fingers	4	9	4	3	10	—	8	17	7	5	14	2
,, enlarged to umbilicus	—	1	—	—	—	—	3	—	—	—	—	1
Number examined	24	43	19	100	66	33	32	125	83	100	174	87
Spleen rate—approx % ...	58	55	79	94	65	64	53	60	57	88	64	50

HIGH ALTITUDE.

Summary of stool examinations.

	Number examined First age-group, 104.				Number examined Second age-group, 327.				Number examined Third age-group, 411.			
	Dedza	South Nyasa	Kota-Kota	Cholo	Dedza	South Nyasa	Kota-Kota	Cholo	Dedza	South Nyasa	Kota-Kota	Cholo
Number examined per district	9	39	10	46	24	119	55	129	87	174	15	135
Number positive:												
Ascaris ova	3	—	—	12	6	4	—	—	31	3	—	—
Hookworm ova	2	6	—	2	1	25	26	3	8	45	4	2
Hookworm and ascaris ova ...	—	—	—	—	—	—	—	57	—	—	—	53
S. *mansoni* ova	—	—	—	—	—	4	—	1	—	7	—	3
Other intestinal parasites ...	—	2	—	—	—	8	—	—	2	10	—	—
Percentage positive—approx ...	55	20	—	30	29	34	47	47	44	37	26	43

Low Altitude.

Summary of stool examinations.

	Number examined First age-group, 223.						Number examined Second age-group, 496.						Number examined Third age-group, 976.					
	Dedza	South Nyasa	Kota-Kota	North Nyasa	Upper Shire	Mlanje	Dedza	South Nyasa	Kota-Kota	North Nyasa	Upper Shire	Mlanje	Dedza	South Nyasa	Kota-Kota	North Nyasa	Upper Shire	Mlanje
Number examined per district	24	43	11	100	12	33	32	125	33	100	69	87	541	184	—	100	31	120
Number positive:																		
Ascaris ova... ...	1	11	—	8	—	13	1	18	—	3	—	33	27	34	—	11	—	40
Hookworm ova ...	7	18	8	2	2	4	13	73	60	4	17	6	360	105	—	—	8	18
S. mansoni ova ...	—	2	—	19	—	—	—	8	1	14	2	—	3	5	—	21	—	1
Hookworm and ascaris ova	—	1	—	—	—	6	—	2	—	—	—	45	—	—	—	—	—	51
Hookworm and *S. mansoni* ova	—	—	—	4	—	—	—	—	—	64	—	1	—	—	—	57	—	1
Hookworm, ascaris and *S. mansoni* ova ...	—	—	—	—	—	1	—	—	—	—	—	2	—	—	—	—	—	6
Other intestinal parasites	—	4	—	—	—	—	—	17	—	—	—	—	—	15	—	—	—	1
Percentage positive—approx	33	83	72	33	16	72	43	94	73	85	27	100	72	86	—	89	25	98

Medical surveys when conducted efficiently are a useful form of propaganda, treatment is given to the sick, and every opportunity is taken to impress upon the people that by the adoption of hygienic habits, many of the diseases from which they suffer could be avoided. It will be appreciated, however, that the numbers with whom contract can be made are limited, as, medical officers cannot remain away from their stations for lengthy periods.

Medical Survey
South Nyasa
District

The Medical Officer, Fort Johnston, in a reference to a village consisting of some 400 huts at which his "high altitude" survey was conducted, states :—

> "There are no sanitary rules in force but owing to persistent propaganda throughout the year, over 40 latrines are now in use and more are being constructed. The inhabitants are now accustomed to proceed to the local dispensary for treatment of their ailments.
>
> The huts are mostly well-built but few have kitchens. Food of all kinds is plentiful, maize being the chief item of diet; milk is not used except by the village headman.
>
> The water supply was very unsatisfactory, the sole source being a shallow and dirty water-hole about half a mile from the village. The disadvantages and danger of this was explained and after the survey the headman constructed two quite good wells.
>
> At the end of the survey I treated a large number of patients at the dispensary."

For the "low altitude" survey a village close to the Lake shore at which a case of trypanosomiasis had occurred two years ago, was selected, as it was considered desirable to investigate the possible occurrence of further cases. The village consisted of about 200 huts with single rooms and no kitchens. There were no sanitary rules and the village was in an insanitary state. Supplies of water were obtained from the adjacent lake.

Three hundred and fifty two blood films were examined: no cases of trypanosomiasis were found. In addition to the usual examination, tuberculin tests were carried out on 50 children taken at random from members of the second age group ; 12 gave a positive reaction.

Over 400 cases of various kinds were treated and a number of interesting cases seen, including two tuberculous joints, an old case of infantile paralysis and a congenital spastic paraplegia.

At the end of the survey, the medical officer supervised the construction of a demonstration latrine for the headman and gave an explanatory talk to the villagers on helminthic diseases and their prevention.

Medical Survey
Kota-Kota District

In the Kota-Kota district there is a difference in altitude, between the two villages surveyed, of almost 3,000 feet. In his account of the conditions observed at the hill village, the Medical Officer states :

"I do not think that there are many, if any, villages above this altitude (4,400 feet) in the district. The people are of mixed Angoni-Achewa blood and the young children go naked even in the coldest weather. They rarely wash.

Jiggers are troublesome and the carrier of relapsing fever is to be found in every hut. The villagers informed me that the ticks feed just as readily on the domestic stock as they do on human beings. Goats, sheep, poultry and dogs share the huts of the owners, cattle are separately kraaled in the village.

The village and surroundings were fairly clean. There is an excellent water supply in a valley below the village.

The diet generally seemed scanty and yet both children and adults looked healthy and happy. Maize is the staple food and at this time of the year (October) fresh and dried green leaves, both wild and cultivated, are the main relish.

During my stay treatment was given to the sick of the surrounding villages, minor chest complaints and skin diseases were the commonest ailments seen.

I regard this village as a healthy one according to African standards, it certainly is as compared with the one on the Lake shore where I conducted my other survey."

A scrutiny of the tables which summarise the results of the various specimens examined, confirms this statement. The average haemoglobin percentage of the hillpeople is the higher, their spleen rate is lower, a smaller percentage of them harbour malaria, schistosomiasis and intestinal parasites occur less frequently.

Medical Survey
Dedza District

The surveys performed in the Dedza district were carried out in areas where conditions closely resembled those prevailing in the Kota-Kota district, one village being at an altitude of 4,800 feet and the other at about 1,700 feet above sea level.

A marked feature of both the latter surveys is the small degree of bilharzial infection recorded. The report of the Medical Officer, Dedza, indicates that this is due to natural causes rather than to any hygienic precautions on the part of the inhabitants, as, at the hill village the bathing places are situated in running streams with rocky beds while, owing to the prevalence of crocodiles in the river utilised by the lowlanders, larger areas than usual are cleared of sedge and reeds, thus discouraging snails as well as reptiles.

Both of the Native Authorities concerned are making an attempt to effect improvements. In his description of the sanitary environment of the highland village the medical officer reports :

"There were 81 huts populated by 183 people. The huts were mostly rectangular and built of wattle and daub with grass roofs. They were erected in haphazard fashion and in every case were insufficiently ventilated.

There were 50 pit latrines, most of which were not deep enough and the shelters provided were in all cases too low and their entrances too narrow. Natives themselves admit that on account of snakes they are afraid to enter such latrines, yet they keep on building them ; one wonders if they construct them just to pacify the visiting medical officer.

The maize and millet crops were poor owing to excessive rain. Other crops grown in the locality included cassava, sweet potato, pumpkin, beans, turnips, tomatoes and peaches. Fish, both fresh and dried, forms the principal source of animal protein. Although there are five kraals with an average of 20 head of cattle, meat is rarely eaten and milk is not generally consumed.

A careful search failed to reveal mosquito breeding places but such must exist during the rainy season.

During the course of the survey, simple lectures were given on hygiene and sanitation. Special stress was laid on the importance of suitable diets."

Reasonably clean conditions prevailed at the lake level village. The Native Authority of this area attended a course of instruction at the Jeanes Training Centre and is keen on improving the living conditions of his people. Some 64% of huts were provided with latrines which were evidently in use : domestic stock are gradually being transferred to kraals outside the village.

The medical officer drew attention to some points of considerable importance, (*a*) of the 541 persons examined in the adult age-group, no fewer than 159 were well over 60 years of age ; very few men under 45 were seen. The explanation given by the villagers themselves was that all the younger men had left the country. (*b*) On enquiry it was found that 118 women had lost between them 126 children.

Medical Survey
North Nyasa
District

In the district of North Nyasa the rising lake is having a serious effect on the health of the inhabitants of villages situated close to the shore. In many places swampy marshes are to be seen where a year or so ago dry sandy beaches stood between villages and the lake.

The village where the survey was held is situated on rising ground some 300 yards from the shore. The intervening area consisted of reed covered marsh containing water to a depth of 3 feet in some places; anopheline larvae were present in considerable numbers particularly at the edges where the water was shallow.

The huts are built in three lines and originally each hut had its own latrine. Owing to the height of the sub-soil water the occupants of the front line of huts have been compelled to abandon their latrines and were making use of secluded patches in the swamp.

The medical officer in commenting on the high incidence of rectal schistosomiasis remarks:

> "In this marsh B. *africanus* is prevalent. Limnea were also found but in a search extending along the lake shore from the River Songwe to Deep Bay (approximately 50 miles), I did not see a single Planorbis. It would appear that this mollusc is not the carrier of the disease in this district and another snail must be concerned.
>
> Infection and reinfection must occur as the people traverse the swamp on the way to the lake. They have been induced to construct a causeway and to refrain from making use of the swamp water. Practically all of those found suffering from schistosomiasis were persuaded to attend at the district hospital for a course of injections".

Medical Survey
Upper Shire
District

The Upper Shire district is in sub-medical charge of an African hospital assistant who is supervised by a medical officer attached to the African Hospital, Zomba. The latter officer carried out the first medical survey held in the district and experienced the difficulties usually met with in these circumstances. He states in his report:

> "In the month of June I carried out a survey in Yao territory in an area which had virtually no experience of European medicine. I had the greatest difficulty in overcoming the suspicion of witchcraft and although I was able to obtain my full complement of subjects for clinical examination and blood slides, many of them failed to present their specimens of stool and urine.
>
> Malaria is hyperendemic. From May until August there are few mosquitoes and new infections at that time are probably negligible. By this time (June) the subjects have had nearly two months to rid themselves by the *vis medicatrix naturae* of their malaria. The heavy infection rate which persisted is an indication of the severity of the disease during the rainy season.
>
> The diet of these people was remarkable for its lack of variety. Maize or cassava porridge with green cassava leaves as relish was the staple meal, varied occasionally by fish.
>
> No cattle are kept owing to the closeness of the tsetse fly areas; goats appear to thrive".

Medical Survey
Mlanje District

The survey in the Mlanje district was carried out at the village of a Native Authority who is regarded as being one of the most progressive in the area; he has made some endeavour to impose the use of pit latrines in his villages. His efforts do not appear to have met with the deserved success and the condition of the inhabitants with regard to parasitic infestations is, to say the least, unsatisfactory.

Mlanje is the centre of the tea industry and during the plucking season natives of Portuguese East Africa are employed in considerable numbers. The working capacity of the local native is said to be poor and this is not surprising in view of the assortment of parasites harboured by young and old.

Jeanes Training Centre.

Medical Survey

A comprehensive survey of the African population of the Jeanes Training Centre was carried out during the year by the Medical Officer, Zomba.

This survey is reported separately as the teachers and community workers in residence were found to be drawn from every administrative district in Nyasaland with the exception of Chikwawa; four adults and two children came from outside the Protectorate.

The community consisted of 93 males and 96 females, their age distribution was as follows:—

Males	adult	48	...	Females	adult	48
,,	under 2 years	17	...	,,	under 2 years	11
,,	over 2 years and under 10 years	23	...	,,	over 2 years and under 10 years	32
,,	over 10 years	5	...	,,	over 10 years	6

The accommodation provided for each student at the Centre consists of a three roomed hut, a kitchen and a deep pit latrine, in addition, he is allotted a garden in which he is encouraged to cultivate the food requirements of the household. The following monthly allowances are paid :—

15/-	for a single man or man and wife.
17/6	for a family with one child.
£1	for a family with two or more children.

Out of this allowance the student must provide clothing, household needs and any food which his garden is unable to supply.

Water is obtained from the Domasi River, which is close to hand; neither bacteriological nor chemical tests have been carried out and no opinion can be expressed as to its quality, except, that it is probably superior to the usual village supplies. This river and a stream which flows slowly through the area reserved for cultivation afford breeding places for mosquitoes—anophelines and culicines. The stream is the greater menace to health, for while still within the boundaries of the Centre, it enters upon low lying ground and converts it into a swamp. Improvements could be effected by expenditure on canalization of the banks, grading of the stream bed and by laying a system of permanent drains through the marsh in which the stream terminates.

Examination of blood films revealed that of the first, second and third age-groups, approximately 60 per cent, 47 per cent and 44 per cent of the specimens respectively, contained malaria parasites. The extent to which residence at the Centre was responsible for infection cannot be estimated as an interval of over six months occurred between arrival of the students and the commencement of the survey.

Medical histories

An effort was made to obtain medical histories. A questionnaire dealing with previous illnesses was distributed to teachers and community workers and some interesting information was obtained. Although it is unlikely that misleading answers were deliberately given, the replies must be accepted with reserve; so much depends on the memory of the individual, the age at which the illnesses occurred and the fact that in most instances the diseases were diagnosed by the patients themselves, their parents or their friends. As an example, 28 per cent. stated that they had had smallpox yet only 14 per cent. gave a history of chickenpox, the relative incidence indicates that these two diseases were probably confused. Vaccination had been performed on 87 per cent.; 25 persons had not been vaccinated and some 50 per cent. of these were under the age of 2 years.

Measles.

A previous history of measles was obtained from 23% of the children under the age of 10 years and from 29% of the older members of the community. If these figures are indicative of the degree of infection of the general native population it will be appreciated that it must contain a high proportion of susceptible persons.

Of the common endemic diseases a previous history of either malaria, dysentery or urinary schistosomiasis was given by 40%, 20% and 21% of the community, respectively.

Five of the 48 women had never been pregnant, from the remaining 43, a history of 162 live births and 23 miscarriages and stillbirths was obtained, 58 (35%) of the children born alive had since died.

The carrying out of a survey in a community of this type is simplified by the readiness with which such specimens as faeces and urine are produced for examination; prejudices are overcome without difficulty.

Laboratory results

In the following summaries, results are expressed under the age-groupings adopted for district surveys; persons over the age of 10 years and not classed as adults are included in the latter age-group to maintain uniformity. The results are shown separately for each sex.

HAEMOGLOBIN ESTIMATIONS.

Hb %	First age-group		Second age-group		Third age-group	
	M	F	M	F	M	F
100 ...	0	0	0	2	20	9
90 ...	4	0	7	8	16	15
80 ...	1	3	5	11	10	15
70 ...	3	4	5	5	6	7
60 ...	4	2	3	6	1	6
50 ...	5	1	3	0	0	1
40 ...	0	1	0	0	0	1
Average Hb %	67	66	74	78	89	81

BLOOD FILMS

	First age-group M	First age-group F	Second age-group M	Second age-group F	Third age-group M	Third age-group F
Number examined	17	11	23	32	53	54
Number positive:						
P. falciparum	11	6	14	12	20	25
P. vivax	—	—	—	—	—	1
P. malariae	—	—	—	—	1	—
Gametocytes: Type undefined	1	1	—	1	1	4
Percentage positive per age-group	60		47		44	

SUMMARY OF STOOL EXAMINATIONS.

	First age-group M	First age-group F	Second age-group M	Second age-group F	Third age-group M	Third age-group F
Number examined	17	11	23	32	53	54
Number positive:						
Hookworm ova	4	3	7	17	29	24
Ascaris ova	1	1	—	1	—	1
S. mansoni ova	—	—	1	1	3	1
Strongyloides	1	—	—	—	—	—
Percentage positive per age-group	35		49		54	

SUMMARY OF URINE EXAMINATIONS.

	First age-group M	First age-group F	Second age-group M	Second age-group F	Third age-group M	Third age-group F
Number examined	17	11	23	32	53	54
Number positive:						
S. haematobium	—	1	2	2	6	7
Percentage positive per age-group	3.5		7.2		12.1	

SUMMARY OF SPLEEN EXAMINATIONS.

	First age-group M	First age-group F	Second age-group M	Second age-group F
Spleen—not palpable	8	7	10	21
,, palpable	6	4	12	11
,, enlarged two fingers	1	—	1	—
,, enlarged three fingers	1	—	—	—
,, enlarged four fingers	1	—	—	—
Spleen rate per age-group	46.4		43.6	

In view of the small percentage of the first and second age-groups infected with *S. haematobium* and in the absence of any other cause it may be assumed that the splenic enlargement recorded is due entirely to malaria.

Physical examination

(*a*) Diseases of the mouth. Approximately 32% of the community over the age of 2 years had one or more carious teeth; dental defects were more common amongst the female members, one of whom had eleven teeth showing signs of decay. 8.5% of the adult group had pyorrhoea; 6% of the first and second groups had stomatitis and 19% enlarged tonsils.

(*b*) Vision. Four adults had defective vision.

(*c*) Diseases or defects of the nasal cavities. Deflected septum was found in 20% of the adults associated with hypertrophic rhinitis.

(*d*) Diseases of the ear. One child under the age of two years was found to have otitis externa and one in the older age-group had otitis media.

(*e*) Nutrition. The nutritional state is reported as "good" in the case of 170 of those examined and "fair" in reference to the remainder.

The results of tuberculin tests performed on 96 children are recorded in Section II(C) of this Report.

In the following table the heights and weights of 83 adults are recorded.

	Males				Females			
		lbs.				lbs.		
Height	No. of persons examined	Average weight	Minimum weight	Maximum weight	No. of persons examined	Average weight	Minimum weight	Maximum weight
4′ 9″					3	93	82	100
4′ 10″					4	113	106	117
4′ 11″					4	116	107	122
5′					3	106	96	126
5′ 1″					8	115	96	123
5′ 2″	1	112	—	—	15	115	95	134
5′ 3″	6	122	115	139	2	120	120	120
5′ 4″	6	125	107	138	3	141	123	173
5′ 5″	9	130	115	168	1	131	—	—
5′ 6″	9	133	118	154				
5′ 8″	7	143	129	152				
5′ 9″	3	156	143	173				
5′ 10″	2	137	129	145				
5′ 11″	1	143	—	—				
6′ 6″	1	134	—	—				
	45	—	—	—	43	—	—	—

(III) School Hygiene.

School inspections

School inspections form one of the most important of the functions of the Health Department and it was originally intended to inspect thoroughly and to examine the pupils of at least one of the larger of the African schools in each district, every year. The performance of routine work has, however, prevented the fulfilment of this programme and only a very small percentage of the schools have been visited during 1937. The schools at which medical inspections were carried out are as follows:—

Central School, Karonga

The numbers examined were, boys 251 and girls 38, this school has now been medically examined for the last three years. The medical officer remarks that the school buildings provide ample light and ventilation for the pupils, this is important in view of the dangers of an epidemic, such as the outbreak of cerebro-spinal fever which occurred during the year and which necessitated the closure of all schools in the Southern Province. Considerable importance is attached to personal hygiene at this school and pupils have to wash their hands and clean their nails before each meal, they also have an hour's physical training daily; latrine accommodation is sufficient. In previous years treatment has been carried out for helminthic diseases, for malaria and other infections.

In the classes aged 16 and 17 years in which 35 and 48 pupils respectively were examined, the haemoglobin percentage in 1937 was 92% as compared with 73% for 1936 and it is interesting to note that for the first time, out of the 251 male pupils examined, 90 or 36% had a haemoglobin index of 90 or over.

Two early cases of leprosy were discovered during the medical examinations.

Providence Girl's School, Mlanje

This school has also been medically inspected for the last three years. A high incidence of helmithiasis occurs, ascaris was found to be the most common parasite, 132 out of the 167 pupils examined being infected. The haemoglobin index, in contrast to the findings at the Karonga school (see above) did not exceed 80.1% for any single group, the younger groups, ages 7 to 10, as might be expected, averaged figures as low as 65%. The condition of the tonsils was remarked upon last year and this year 16.6% of pupils were found to have definite tonsillar disease, 1.6% had middle ear disease, and 1.6% had organic heart disease. Pyorrhoea was reported in 18.9% of all pupils and is a reminder that the practical application of the hygiene taught in the school is both necessary and desirable. A child of 12 was observed to be 3′ 10″ tall with a weight of 48 lbs., the condition being thought to be a Lorain type of pituitary dwarfism.

Kasina Mission School, Dedza

The school buildings are well constructed of permanent materials and provided ample ventilation and lighting. Electric light has been installed. Latrines, water supply and refuse disposal by incineration are all provided and are efficient. The pupils obtain an adequate dietary which consists mainly of maize with meat, ground nuts and beans in rotation, and supplemented according to the season with citrus fruits, bananas, sweet potatoes, tomatoes, etc. 108 pupils were examined and the results of the regular and sufficient food supply together with the attention paid to the principles of personal hygiene, combined with exercise both of the mind and body are shown in the records of the medical inspections; the parasitic infections tend to disappear in proportion to the time pupils have been at school, and the general improvement in mental alertness and in physical condition is remarked upon by the teachers.

Mission School, Mponda's, Fort Johnston

The buildings were found to be satisfactory but the latrine arrangements were considered to be insufficient. A total of 83 boys and 24 girls were examined. All pupils requiring medical treatment were dealt with.

Catholic Institute, Blantyre

This school also has been inspected for the last three years, the number of pupils examined was 60. Possibly to some extent owing to the factor of new arrivals, the results of the investigations carried out do not reveal any considerable improvement over the results obtained in 1935 and it would appear that stricter attention should be paid to diet, latrinization and bathing facilities. In 1935 the nutritional standard was put at:

Good	...	...	74.2 per cent.
Fair	...	...	21.2 ,, ,,
Poor	...	...	4.6 ,, ,,

In 1937, the medical officer states that "out of 60 only 5 showed weights comparable to the average male European child of the same age, the rest were below par and 18 grossly below par". The results expressed in the form of percentages are:—

Good	...	...	8.5 per cent.
Medium	...	...	61.6 ,, ,,
Poor	...	...	29.9 ,, ,,

On the other hand it is remarked that the condition of the skin has improved generally and that the teeth were found to be in excellent condition, so that it would appear that the nutritional standards adopted in the two examinations were entirely different.

European schools

All the European schools were inspected during the year. Owing to the small number of European children of school age in Nyasaland, the results are not worth publishing. The general nutrition, physique and intelligence of the pupils were found to be satisfactory.

(IV) Labour Conditions.

Examination of indentured labour for South Africa

Practically all indentured labour proceeded to South Africa for work on the Rand.

At one station, Dedza, the medical officer examined 1,435 recruits, of these 1,135 were passed as fit. Out of the total number only 27 had had previous experience of work in the Mines. The most common cause of rejection was on account of 'enlarged spleen' which accounted for 112; 38 were under the standard for weight, 28 were suffering from venereal disease (1.9 per cent.) and 28 from bilharziasis, none from ankylostomiasis. Later on in the year with the concurrence of the Witwatersrand Native Labour Association men found on urine examination to have bilharzia infection, were, if otherwise fit, passed. Defective vision and umbilical hernia accounted for the majority of the other rejects.

All the labour sent for examination was picked labour and the statistics obtained do not represent the result of random sampling of the male population.

In his annual report for the Dedza district the medical officer deplores the loss in certain villages, of the majority of the male population through emigration and states that in such villages it is impossible to carry into effect sanitary works, such as the digging of latrines, etc.

At Lilongwe and Mzimba, similar examinations of indentured labour were carried out, the total number examined during the year being 1,156, of this number 910 were passed as fit.

The chief causes of rejection in these districts were schistosomiasis, heart and chest conditions, under weight and pyorrhoea; it is curious that only one was rejected on account of an enlarged spleen.

A considerable number were rejected on account of some abnormality of the heart or lungs. The standard of examination was high and each individual was given a hard race of 150 yards and then examined, any whose heart muscle was out of tone as shown by greatly increase rate or absence of good muscle contraction sounds, were rejected.

Shortage of adult male population in rural areas, owing to emigration

Other district medical officers echo the complaint of the Medical Officer, Dedza, in respect of the absence of a large number of the fit adult male population. In the Fort Manning district where particular efforts had been made to clean up and repair the villages, to install latrines, and to provide separate accommodation for such animals as pigs, sheep and goats, the result of emigration is being felt. Adult labour required for the harder work of the village being at a premium, the consequence is that where a year or two ago, clean and well laid out villages were in evidence, now, through neglect they have lapsed once more to their previous insanitary condition. In the annual report for the Chikwawa district, the sub assistant surgeon states "I had a talk about hygiene in the nearest villages, I could not get many people as most of the youths had gone to Rhodesia".

Problem of emigration

There is no doubt that a serious problem is presented by this uncontrolled emigration, socially it is disintegrating native life, the dissemination of venereal and probably tubercular disease also, is undoubtedly increased by the return of emigrants who have contracted these diseases abroad. In the case of indentured labour the wives are safeguarded to some extent by the remittance which is now insisted upon, yet it is a moot point, if the women themselves are sufficiently educated to be able, in the absence of the males, to utilize the money sent to them in a way advantageous to themselves, their children or their homes.

Certainly in districts where the exodus of labour has become acute the inauguration of some welfare system by which the expenditure of the 'remittance funds' could be guided along more economical channels would seem to be essential. It would appear that in certain localities through force of circumstances and economic pressure the home life of the rural population has been disrupted to such an extent that only by equally forcible methods can the balance be readjusted. In short, the stage has been reached when the trusteeship imposed by our 'protection' of Nyasaland requires the closer and more intimate supervision of native interests.

Repatriates

Repatriated labour continued to arrive back in Nyasaland from Southern Rhodesia throughout the year, and certain measures have now been taken for their better care on arrival. A well built brick rest house has been erected at Blantyre, the building comprises a large waiting room and a dormitory with the necessary adjuncts, lavatories, kitchens, etc. The numbers returned are in excess of 1936 and the schedule of their disabilities makes dismal reading.

The following figures give the necessary statistical detail.

	Males.	Females.
1936	170	6
1937	236	16

The main diseases which were stated to have caused repatriation are as follows:—

	Total number.	Percentage.
Leprosy	6	2.3
Tuberculosis, pulmonary	35	13.8
Hemiplegia and other forms of paralysis	10	3.9
Epilepsy, dementia and other form of mental disease	26	10.3
Blindness	9	5.5
Lung conditions other than tuberculosis	14	5.9
Amputations	12	4.7
Fractures	19	7.5
Debility	20	7.9
Syphilis	2	0.79

The repatriates labelled 'pulmonary tuberculosis' were placed in hospital and subjected to rigorous examination. In 12 only was evidence found of active tuberculosis, even so, if only 12 out of 252, i.e. 4.7% return with tubercular disease each year the spread of the infection is ensured, moreover, there is no information obtainable, as yet, of what number of the thousands of returning emigrants, who do not present themselves for examination, are infected with this and other contagious diseases.

(V) Housing and Town Planning.

Housing of native employees

The housing of native employees both of Government and of private individuals presents a perpetual problem in the smaller stations and in those areas for which Sanitary Boards have been appointed as local authorities. Funds in such areas or localities are so inconsiderable that it is with the greatest difficulty that even the elements of sanitation can be carried out. A certain amount of cleaning, grass cutting, market improvement and attention to night soil disposal, are all that can be accomplished. Government departments are usually provided with 'lines' for their employees, but these are frequently of temporary construction and soon become dilapidated and insanitary. It is considered that each station should have a suitable and well drained area set aside for native settlement, buildings should be constructed of permanent materials and a good water supply should be available. Government by reason of the general low standard of accommodation provided for its employees has laid itself open to criticism both by the health officer and by the private employer of labour.

Recommendations with regard to housing made by the Native Welfare Committee

The Native Welfare Committee in 1936 in a recommendation made to Government upon this subject adopted the following principles :—

(i) that all native civil servants should be provided with free quarters,

(ii) that all local casual and unskilled labour employed by Government and residing more than 5 miles from a Government station should be provided with free quarters,

(iii) that the minimum type of accommodation should be a burnt brick *rondavel* or single room with a grass roof,

(iv) that Government should explore all avenues for obtaining funds for the provision of adequate housing for its employees,

(v) that Government should be prepared to encourage municipalities, by means of loans, to erect model villages for the accommodation of labour working in the townships,

(vi) that a limitation should be placed on the provision of quarters for the native servants of European officials and that not more than two quarters should be erected in any compound, any additional accommodation provided by Government in excess of this scale to be erected in the native location or village.

Model villages

General progress has been made in the model villages in the three Townships of Zomba, Blantyre and Limbe and it is satisfactory to note that the Town Councils and Government have completed a part of their programme and have erected permanent quarters to replace temporary buildings. All Government employees have, with the exception of the district police, been removed from the residential area in Zomba. A commencement has also been made, by the construction of new and permanent quarters in the model village, to remove personal servants and their families from the compounds of European officials. A definite scheme of building is being undertaken annually both by the Town Council, Zomba, and Government.

Housing conditions on Private Estates

Inspections carried out during the year at small estates indicate that housing conditions generally compare very favourably with those obtaining in the larger estates, 75% of the labour employed on the small estates being permanent or tenant labour. Houses are fairly well constructed and there is usually ample ground available for the cultivation of food crops by the natives. Latrines are non-existent or inadequate in the villages situated on private land, a condition of affairs which is, unfortunately, common to the mixed Anyanja-Anguru stock in the Southern Province. Asiatic housing in all townships remains unsatisfactory. New bye-laws are being introduced with a view to obtaining adequate lighting and ventilation, a sufficient area for habitable purposes on each plot, and to prevent living in premises used in connection with the sale or storage of foodstuffs.

Rest houses or shelters for emigrant labour

During the year a sum of £600 was made available from the Native Administration Central Fund for the purpose of constructing native shelters or rest houses in the Northern Province. It was eventually decided that the type of rest house should follow on the lines adopted in Tanganyika, that is to say, the semi-circular Nissen hut which can be moved and reconstructed if necessary. The huts are to be erected on labour routes and will fill a long felt want.

Accommodation for natives travelling by Lake steamers

At a meeting of the Medical Council the question of the provision of accommodation and sanitary conveniences for native passengers travelling by Lake steamers was discussed. Evidence had been produced which appeared to indicate that the arrangements in certain instances left much to be desired and that shelters and latrines were required at many of the stopping places. Government undertook to see that shelters, etc., were maintained.

(VI) Food in Relation to Health and Disease.

Three cases of a disease which was considered to be beri-beri occurred at a district prison, the contributory causes being an insufficient diet, a poor standard of accommodation and possibly, a change over from the staple diet of maize to which these prisoners were accustomed, to a diet consisting mainly of cassava.

The outbreak is dealt with in Section II (B) General Diseases.

Nutrition

During the year replies to the questionnaire on 'Nutrition', drawn up by the Health Department at the instigation of the Native Welfare Committee and submitted to all District Commissioners, to Missions, to Agricultural and Forestry officers and to certain educated Africans, were received.

The mass of information was sorted, extracted and tabulated by the Medical Department and was submitted in the form of a Memorandum to the Native Welfare Committee and adopted by them.

The memorandum is attached to this report as Appendix IV.

Native Hospital diets

During the last few years, attempts have been made to raise the standard of the dietary at African hospitals by the addition of such quantities of meat, green vegetables, groundnuts and beans to the staple diet of maize, cassava or rice as will provide a well balanced and adequate diet. The actual quantities and constituents of the diets depend to a considerable extent upon the availability of local supplies but, on the whole, the hospital diets may be said to be adequate. It is interesting to compare the costs of the diets in four of the larger hospitals situated in different districts of the Protectorate, this comparison also demonstrates how the cost of living varies from district to district.

The table below while setting out the cost per head is not to be taken as an accurate comparison for the reasons mentioned above.

African Hospital	Average daily number in hospital	Cost of maintenace (food)			Average cost per head per day.
		£	s.	d.	d.
Zomba ...	... 82.41 ...	427	12	4	... 3.41
Mlanje ...	... 37.99 ...	95	16	2	... 1.66
Fort Johnston	... 67.83 ...	59	8	5	.. 0.57
Kota-Kota	... 50. 4 ...	75	16	5	... 0.99

(B) MEASURES TAKEN TO SPREAD THE KNOWLEDGE OF HYGIENE AND SANITATION.

Village development

In the Annual Report of last year, mention was made of the valuable work which had been performed in the Fort Manning district in the shape of village improvement, several villages had been entirely re-constructed and re-modelled, latrines and animal shelters had been erected, sites for water supplies and for bathing facilities had been demarcated, etc., etc. It is unfortunate that retrogression rather than progression in rural hygiene, particularly during the last year or so, has occurred as owing to the large proportion of the adult male population emigrating or leaving the district in search of work, practically no building or constructional development is possible and the villages that were re-modelled are gradually slipping back to their ancient insanitary conditions. This state of affairs affords a good example of how much village uplift depends on the raising of the social and economic level of the rural population, and the statement made by the Preparatory Committee of the Conference of Far-Eastern Countries on Rural Hygiene is worth quoting:

> "Unless the economic and cultural level of the rural population can be raised, there can be no hope of employing curative or preventive measures with any degree of success".

Training of rural sanitary inspectors

During the year, owing to the great diminution of the incidence of small-pox the opportunity was seized upon to select certain of the better educated of the vaccinators and to send them to Zomba for a course of training in such sanitary measures as might be applicable and practicable in the villages and in the rural areas generally.

Rural development

The experiment in rural development sponsored by the Native Welfare Committee in 1936 proceeded a step further in the Ncheu district, there, the District Commissioner formed a development committee consisting of the District Commissioner, the Medical Officer, the Acting Conservator of Forests, the Agricultural Officer and the Superintendent of Education.

After discussion of the objects in view, four areas, where boring operations had been carried out and where wells had been established, were chosen as suitable for the experiment. At each well there was already a nucleus of settlers who would, in the course of the year, be building more permanent structures than their present dwellings. It was decided that the following points should be borne in mind in connection with the scheme.

(*i*) *Medical.* The latrinization of the area, a hookworm campaign and the possible provision of a dispensary.

(*ii*) *Educational.* The allocation of sites for schools and play grounds. The posting of a trained Jeanes' Centre community worker.

(*iii*) *Agricultural.* The encouragement of an ample food supply, introduction of good seed, use of this area as a distributing centre. The development of economic crops: cotton, castor oil or soya bean; conservation of manure: compost pits, and experimental plots.

(*iv*) *Forestry.* Village forest areas, preservation and control of slopes by tree planting.

(*v*) *Veterinary.* After intensive cultivation and settlement the introduction of cattle (a tsetse fly area).

Later on in the year, the marking out of villages and areas for cultivation was commenced. The agricultural officer proposes to open a demonstration plot for the benefit of the four villages.

The scheme is developing.

Agricultural Show

The medical exhibit at the annual Agricultural Show was somewhat cramped with regard to space and the accommodation which had to be found in the Club buildings was not attended by the native element to any great extent. The exhibit included the following displays:—

(*a*) *Hygiene and Sanitation*; Model of septic tank for use on a farm or small estate, apparatus for water filtration, a model slaughter house, illustrations of anti-malarial drainage, methods of fly destruction, etc. Planters were particularly attracted to learn how cheaply an efficient system of night soil disposal could be installed.

(*b*) *Infant Welfare.* Baby weighing scales, charts illustrating milk and other infant food values, simple cot made of a tobacco basket at a nominal cost.

(*c*) A hospital cubicle complete.

(*d*) Information bureau, pamphlets, charts, statistics, facts concerning malarial prophylaxis, plans of model houses (European and Native), details of cost.

(*e*) A model dispensary for use on a small estate.

(*f*) *Pathological section.* Life history of common parasites, etc.

The dispensary exhibit was much appreciated and the infant welfare stand was very popular with the women and children, considerable surprise was evinced at the completeness of bedding and equipment.

Propaganda

The writer is firmly convinced that of all the methods practiced by the Health Department in spreading the knowledge of hygiene and sanitation, that involving personal contact is infinitely the best.

Amongst the million and a half native inhabitants of the country, there is still a large proportion, particularly among the women and children, who have little direct knowledge of the European and his ways. Customs, superstitions and taboos still hold sway to an unbelievable extent and it is not until personal demonstration and personal contact have been secured, that doubts and fears are dispelled; once confidence is gained the rest follows as a matter of course

That this confidence is being slowly and surely gained is evident in various ways, only last year it was reported that a medical officer had been invited to participate in the circumcision ceremony and had taught the native operators a clean and painless method of performing the ritual. The numbers of women and children treated at hospitals is on the increase. Surgery is becoming not only popular but fashionable in some districts. An unsolicited testimonial of the appreciation felt by a native chief at a medical officer's visit and at the work performed during a medical survey is of interest. The extract quoted below appeared in the local vernacular newspaper and is headed 'HELP.

> " I am much obliged to the medical officers of the hospital for the good work which they did at the Court of Native Authority Mwambo. On 3rd September, 1937, there came a European to see the Native Authority: he informed him that he would come again on 6th September to establish a medical camp, and requested that some grass shelters be built. This work was quickly executed, and on 6th September the Bwana came with his 3 boys. Within an hour of his arrival a Government transport fully loaded with dressers, 3 soldiers* and their sergeant* also arrived.

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*Note. The "soldiers" mentioned were stretcher bearers of the King's African Rifles in training.

The drugs and tents were unloaded; one hut of 3 rooms had been erected and this was soon filled with hospital stores. Bwana and his clerk, 3 dressers, the Chamba dispensary dresser and his servant started work at once, From 6th until 11th September they were very busy amongst us and on 12th they left for Zomba Town. This Bwana helped many people by removing swellings, etc., and gave injections to patients, nursing them well. This pleased me, and I hope it will be possible for them to come again next year. "Without knowing anything a monkey killed himself with a knife". By this I mean to say that the people of this country were afraid to go to hospital, but to-day seeing the good work done by the hospital, many people are willing to be treated there".

Inspection of estates

Inspections of estates were carried on to a limited extent and the visits of the medical officer were generally appreciated and have borne fruit in the shape of an improvement in housing conditions, etc., in many instances.

Development of Native markets

The Native Welfare Committee were active in stimulating native trade and incidentally encouraging the clean and hygienic exposure of foodstuffs for sale by the provision of markets which would conform to a model plan prepared by the Health Department. A scheme was drawn up showing in detail the lay-out of a small market and an estimate of the cost of erecting the necessary buildings was given. It was suggested that buildings might be constructed of temporary materials in the first instance and that District Officers should be circularised with a view to finding out if, in the event of funds for capital cost being available, they considered that the construction of permanent materials on some of the already existing market sites would be of value to their districts from the economic and hygienic points of view. The lay-out included,

(*a*) Meat, fish and tea shelters and a room for meat storage.

(*b*) Brick and cement sales counters.

(*c*) A simple type of slaughter house.

(*d*) Latrines (pit).

(*e*) Fencing and the siting of shade trees.

(C) TRAINING OF AFRICAN PERSONNEL OF THE MEDICAL DEPARTMENT.

Need for trained African staff

The importance to the country of the provision of a well trained African staff cannot be over-emphasized as it is only by reliance on the African himself that any expansion of health services is likely to be made possible. The necessity for the provision of trained staff is manifest; the lack of such staff is retarding progress and indirectly the development of the country. Owing to the lack of accurate vital statistics it is difficult to demonstrate to Government in a practical way the loss, economic and financial, that occurs through the chronic ill-health of the indigenous population. It is equally difficult to assess the true proportion of expenditure which should be allocated to the Health Services of the Territory, it is a fact, however, that big businesses such as the Gold and Copper Mining Companies have realised the economic value of the expenditure of funds for the general betterment of their employees.

Training at the African Hospital, Zomba

In the Annual Report for 1936, an account was given of the steps which had been taken to put the training of the African personnel of the Medical Department on a systematic basis. The development and adaptation of the African Hospital, Zomba, as a training school was described and the curriculum for the training of dressers and native nurses was given in detail.

Difficulties incipient to the inauguration of a new procedure were at first encountered and the medical officers upon whom the brunt of the re-organization fell responded nobly, and, in the course of the year, work at the Medical School was proceeding smoothly and efficiently.

One of the chief troubles encountered was the general shortness of nursing staff in the department. It was found necessary on numerous occasions to detach one or other of the sisters at the African Hospital, Zomba, for other duties in the Department when casualties occurred, thus interrupting the classes of instruction and other important duties. This defect in the organization was brought to the notice of Government and it is with pleasure that one records that provision has been made for an additional sister for casualty and other duties in the 1938 Estimates. As our colleagues of the Education Department have doubtless discovered, the art of teaching an African is one which requires an infinite amount of patience and experience, in other words, no matter how skilled the teacher may be, he has to serve an apprenticeship before he becomes a duly qualified master. The lesson is being learnt by the European personnel of this Department at the African Hospital, Zomba. The actual teaching is imparted by the medical officers attached to the hospital, by the nursing sister who has had tutorial experience and by the African hospital assistants. To complete the staff and to add a modicum of military discipline to the probationers' curriculum, an instructor, preferably a R.A.M.C. staff sergeant is required; such a N.C.O. should be competent to teach physical training, first aid, stretcher drill, nursing and dispensing. At the medical school, lecture notes are issued and these are so popular that members of the permanent staff of the hospital borrow them in order to compile reference books for themselves.

Practical work, throughout the course of two years, is considered the most important part of their studies. Physical training has now, thanks to the courtesy of the Chief Commissioner of Police, been introduced and adds variety to the programme. A recreation ground is being made and an application has been prepared and submitted to the Secretary of State for a grant to erect sufficient and adequate accommodation for the pupils, both male and female, in training. The training now undertaken includes:—

(*a*) Training of male dressers.

(*b*) Training of laboratory assistants.

(*c*) Training of native nurses, and, in addition, instruction in midwifery work and infant management.

(*d*) Training of native sanitary inspectors.

Training of the higher grade of African medical assistant is carried out by the Blantyre Mission which is, for that purpose, specially subsidized by Government. Midwives are also trained at the Blantyre and Dutch Reformed Church Missions, both these institutions obtain a grant-in-aid for this purpose.

Training of community workers

Mention was also made in the last Annual Report of the inauguration of a scheme at the Jeanes' Centre for the training of welfare community workers. The system has been in operation for just over a year and should the scheme fulfil the great expectations with which it was launched, considerable improvement in rural conditions should, in due course, be manifested.

The ultimate success of the experiment depends entirely on the co-operation of other departments concerned with native affairs, on the good-will and strong support of the local government (Native Authorities) and on the personal guidance and active assistance of the Administration.

The scheme as originally envisaged, contemplated the employment by each Native Authority or headman of a community worker, who would, by personal application, endeavour to teach the rural population the essentials of hygiene and sanitation, who would guide the people to seek better methods of agriculture and animal management and who could demonstrate methods of conservation of soil and fuel supplies. It is admittedly an experiment in village 'uplift' and as is the case of all reforms, there will undoubtedly be an uphill fight to overcome lethargy, prejudice, superstition and custom. The welfare workers themselves will start with the advantage of having had the principles of community training firmly imbued upon their mind and in the course of their work, they will come into contact with chiefs and headmen who themselves have undergone a course of training at the Jeanes' school; they will be assisted by and will to a large extent be working along similar lines to the Jeanes' teachers who are now scattered throughout the country. It is to be anticipated that there will be many failures, as only men of outstanding integrity and honesty of purpose possessing the will to succeed will prevail. These workers, missionaries in the true sense, will not have the time to devote themselves to the raising of economic crops except for demonstration purposes, or engaging in business for personal gain, so that, as in the case of other social workers, they will, in order that they and their families may live decently and set an example to their compatriots, have to be paid for their services, and it would appear, at any rate during the initiation of the experiment, that their salaries should be adjusted to economic conditions and should be derived in equal proportion from Government funds and from the funds of the Native Authority or Native Treasury. The scheme, as has been mentioned, is an experiment in 'uplift', and is fostered by the Trustees of the natives and should therefore be launched not only with the blessing of Government but also with a sufficient financial backing as a practical token of support and good will.

To many, the birth of the community worker appears as just another addition to the already growing group of Government employees working in rural areas, to wit, the dispenser, the agricultural assistant, the forest guard, the sanitary inspector, the vaccinator, the veterinary assistant, etc., but with a closer examination of the community worker's functions, it will be evident that the latter should lay the foundation upon which the others should build; by directing the attention of the sick to the dispensary, of the insanitary minded to the sanitary inspector, of the poor cultivator to the agricultural assistant, of the cattle owner to the veterinary assistant, etc., the community worker will undoubtedly secure co-operation and co-ordination of effort in the development of the rural areas.

(D) RECOMMENDATIONS.

Native Policy

The statement of policy recorded in the 'Memorandum on Native Policy in East African' affirms that the objective of any Colonial Government is,

> "the general improvement in the standard of native life, alike in economic conditions, in home circumstances and in the physical health of men, women and children, together with the spread of education in the widest sense" ...... "education, sanitation and a progressive raising of the economic standard of life should therefore go hand in hand. Thus, instruction in home and personal hygiene should be secured by efforts to improve the housing of natives, and, generally, the material surroundings in which they live, and the provision throughout East Africa of medical facilities, hospitals and dispensaries should be regarded as of equal importance with the supply of teachers and schools."

Endeavour has been made in the preface to this Report to review the history of the Medical Department, to evaluate the work performed and to make certain consequential recommendations with regard to those activities of the Health Service concerned with the improvement of the physical health and the education in hygiene and sanitation of the native population. But as Government is also concerned with the general development of the country and the promotion of health and education, etc., not only amongst the indigenous population but amongst all its inhabitants "irrespective of race or religion"; it may be as well to recapitulate briefly the recommendations already made, these were :—

Proposals for re-organization

(i) proposals for the concentration and centralisation of staff in order to allow of the organization and performance of preventive health work in rural areas;

(ii) proposals for an increase in the subordinate staff of the Department, both European and Native, i.e. European nurses, health visitors, sanitary superintendents, and Native sanitary inspectors, hospital and laboratory assistants, to make the above proposals effective;

(iii) proposals for an increase in the establishment of beds at certain hospitals, in order to provide the basis of an economic hospital system.

As a corollary to these recommendations the following proposals involving departmental re-organization are submitted, some of these proposals would form part of a long-range programme and a few of them could be given effect to immediately.

I. The gradual replacement of the Asiatic Sub Assistant Surgeon by the African Hospital Assistant.

At present, some loss of efficiency would result if this proposal were given effect to as the Asiatic is at a higher educational and social level than the African, at all events in this Territory.

Over a period of, say, seven to ten years, it is suggested that it might be possible to replace the entire Asiatic staff by Africans and as soon as secondary education is introduced into this country the loss of efficiency caused by such a re-organization would be considerably lessened. The replacement, when completed, should effect a saving of at least £1,000 a year, i.e. the difference between the mean of the Asiatic salaries and the salaries of the Senior Hospital Assistants' grade. Actually, in the department now, there are Africans capable of taking charge of the smaller hospitals.

II. The replacement of the post of Medical Officer at Blantyre by the appointment of a District Surgeon.

This proposal involves the appointment of a qualified medical practitioner as a part time official (a non-pensionable post) who would take the place of the Government medical officer at Blantyre, thus either:

(i) setting the medical officer free to be employed in another capacity, or

(ii) allowing, on the retirement or transfer of any of the present qualified staff, the employment of a *lady medical officer* in lieu—(a step of the very greatest importance).

It is suggested that a district surgeon could be obtained on a salary scale of some £300 to £400 a year, he would occupy rent free, the quarters now occupied by the Senior Medical Officer, Blantyre, and would undertake to perform the duties now carried out by this officer. All his spare time would be devoted presumably to private practice.

III. The replacement of the present European Hospitals at Zomba and Blantyre by one central institution.

The proposal to substitute a central institution for the two out-of-date European hospitals at Blantyre and Zomba is perhaps a council of perfection yet it is not an impossible suggestion, and if carried into effect, should result in greatly increased efficiency and economy.

It has been estimated that a new hospital (including nurses' quarters) at Zomba would cost £6,830 approximately. It might be necessary, as the Town Councils of both Blantyre and Limbe have declined to entertain the suggestion that they should run the Government Hospital, Blantyre, as a municipal enterprise, to maintain a nurse with a couple of casualty beds at Blantyre were the new hospital to be situated at Zomba.

IV. The development of Medical and Health services by means of direct contributions from the local government (Native Authorities).

Development of Health Services by direct contributions from Local Government funds

This proposal depends upon, to an indefinite extent, the progress made ir the experiment of local government. Already, certain Native Authorities hav shown themselves to be alive to the benefits which accrue from the improvements in health and standard of living introduced by the European sanitarian. Some Native Authorities are erecting dispensaries and are providing for staff anc maintenance, others are paying for sanitary police, others are assistin maternity work, etc., etc. This side of local government should expand as th people become more educated and progressive and no doubt in time in certair localities some communities will become, so far as social services are concerned self-supporting. For some considerable time there must be certain minima services provided by Government; at present as has been shown, all medica services are provided either by Government or by missionary bodies, but a development of local government occurs, a larger proportion of these service should be taken over by the Native Authorities.

V. Laboratory Technician.

The appointment of a trained European laboratory technician in order t allow the medical laboratory to function with efficiency in the absence on leav of the Government Pathologist.

VI. Medical Store.

The erection of a new Medical Store on the railway to replace the presen store which consists of a somewhat dilapidated building, originally a privat residence.

VII. Mental Hospital.

A new mental hospital administered by the Medical Department should b provided in place of the old and prison-like institution at present in charge c the Prison Department.

VIII. Vital Statistics.

One of the most important problems to be solved is the collection c accurate *vital statistics*. It is absolutely necessary to have a yard stick t measure the progress made in preventive and curative medicine. N programme of development can be efficiently prepared until data are obtaine as to the morbidity of the people, as to birth and death rates, infant mortalit etc., as stated in section II. (D). The legal mechanism exists in the form of th Statistics Ordinance, 1935, this should now be applied.

SECTION IV.

PORT HEALTH WORK AND ADMINISTRATION.

A quarantine camp is maintained at Port Herald, the first Nyasalar administrative station on the Beira-Blantyre Railway. At this camp, Asiati or Africans who are suffering from or who may have been in contact wit infectious disease may be detained. Any Asiatic or African who is unable produce a certificate of vaccination is liable to similar detention. During th year the number so detained was as follow:—

	Men.	Women.	Children.
Asiatics	—	—	—
Africans ...	27	22	22

Owing to the recent epidemic of cerebro-spinal meningitis, 13 male nativ and one female proceeding outside the Territory were detained for the usu quarantine period.

ECTION V. MATERNITY AND CHILD WELFARE.

Infant welfare work—maxims

I trust Dr. Cicely D. Williams of the Gold Coast Medical Service will forgive e for quoting the following extract from her amazingly interesting article on hild Health in the Gold Coast" (Lancet. January 8th, 1938, page 97). Her atement with regard to the functions of a Health Department in an African ependency is so important and all embracing that it deserves the widest ecognition:

"1. The greater part of the ill-health is preventable.

2. The care of children in the toddler stage is of supreme importance.

3. Improvement can only be effected by health education for the population and by the training of efficient health visitors.

4. Continuity of policy and of personnel is essential to success. An African will take a bottle of medicine from a stranger but he will not take advice. He may listen to his instructions but he will not ask questions.

5. Preventive work must go hand in hand with curative in order to obtain the confidence of the people, adequate care of individual children, and the efficiency of the health workers and the medical services as a whole.

6. Maternity and gynaecological work are needed. By themselves they are of limited value. In spite of their popularity they should not be allowed to overshadow the importance of the other aspects of welfare work.

7. Co-operation with the agricultural, the animal health, the education department, and with the political administration is necessary to teach the population what to grow, how to prepare it, and how to spend their money and conduct their families with the greatest contentment".

Infant welfare work performed by Government

There has been a satisfactory increase in all branches of maternity nd infant welfare work at the African Hospital, Zomba, which is the only centre t has been found possible to establish, with the staff available, as a direct ctivity of the Medical Department.

The following figures show the amount of work performed during the years 936 and 1937:—

	1936	1937	
Ante-natal, new cases	30	85	
Maternity cases, normal	30	43	55
,, ,, abnormal ...	—	12	
Attendances, child welfare ...	1,117	1,262	

It is particularly gratifying to note the increase in the number of cases eeking admission for normal delivery. All new ante-natal cases are thoroughly nvestigated, blood, stools and urines are examined, pelvic measurements are aken and the previous history obtained. Twenty of the women attending he ante-natal clinic came into hospital to have their babies. Propaganda vork has, in the past, been concentrated on the women living in the 'lines' of he King's African Rifles, but a gradual extension has been made during the ear and a nearby village (Native Authority Chikowi) was visited once a week y the Health Sister. Quite an encouraging response has been obtained and oth the Chief and his wife have been most helpful. The attendances from his village were as follows:—

Number of infants admitted to clinic	64.
,, ,, ,, attending	113.
,, ,, ,, treated	35.
,, ,, women attending	175.
,, ,, ,, treated	60.
,, ,, ante-natal cases, new ...	5.

Two certified midwives are employed at the African Hospital, Zomba, and the total of native nurses in training is 14. Operations on women and children are also increasing as the following figures show:—

	1935	1936	1937
Operations, gynaecological	16	11	16
,, on women and children	21	49	184
	27	60	200

Among the abnormal midwifery cases were three patients who required Caesarian section; curiously enough the three cases occurred during the same month. Maternity work performed at other Government African hospitals is almost negligible as the absence of European nurses or trained native female staf make it impossible to undertake this branch of medicine except in emergencies The total number of maternity cases dealt with at all Government hospitals wit the exception of that at Zomba during the year was 65. It still has to b recorded with regret that the three welfare clinics erected from Colonial Deve lopment Funds are not being used for the purpose for which they were intende as the lack of European health or nursing staff renders it impossible to develo further this side of the Department's activities.

Jeanes' Centre.

The following extract from the Annual Report of the Jeanes' Trainin Centre is inserted as it is of great interest in showing the difficulties that ar experienced and how some of them, at least, have been overcome.

Ante-natal clinic

"The women in the villages near the Jeanes' Centre have now begu to appreciate the value of the weekly ante-natal clinics where instructio is given to women students in training. During the year only one woma has been brought in from these villages who had been in labour for mor than twenty-four hours. This is definitely encouraging and a proof tha the women are absorbing the instruction and advice given at the clinics and realise that, in cases of difficult labour, saving of life may depen on seeking skilled help as soon as possible.

Those who have been brought to the labour ward in a septic conditio have come from villages at some distance from the Centre and outside th direct influence of ante-natal propaganda. Such patients have been trans ferred to Zomba Hospital as they required special operative treatment The relatives have been warned that much suffering and possible deat might be avoided if help were sought earlier. Unfortunately scolding an the "I told you so" attitude does not greatly help the situation. The roo of the trouble is in the deeply grounded fears and tribal taboos of the un educated village woman. Only after much careful and patient propagand and demonstration of results can a real impression be made. Only wher such instruction is possible and where the provision of maternity service i within reach of the villagers is it justifiable for Native Authorities to brin pressure to bear on village women who are reluctant to avail themselves o hospital treatment in abnormal cases. The local Native Authority Malemi is keenly interested in the child welfare and ante-natal clinics. Though hi village is beyond the 1½ miles radius, within which cases are visited by th nurse accompanied by student women for instruction purposes, h encourages pregnant women to attend the clinic, and furnishes them wit a note of introduction. Women unable to walk he has occasionally sent i his own rickshaw. In cases of suspected abnormality, he has brough pressure to bear on the relatives to consent to hospital treatment. Thi Chief and his wife were amongst the first students in the Native Authoritie Jeanes' Course. The best means of convincing African women that th European has something worth while teaching, where midwifery i concerned, is by successful demonstration. The women students who hav attended the sixty-three midwifery cases during the year, must benefi considerably from what they see and do, and thus convinced, can use thei influence to persuade others all over the Protectorate, of the value o skilled midwifery both in the home and in the hospital. At least on relative and the native midwife are allowed to be present at the deliver either at home or in the hospital—a valuable addition to village propagand for improved methods of delivery. The permission given to these nativ midwives to be present at the delivery of patients who are normally unde their care, has done much to remove the antipathy of these professiona African practitioners, who might naturally be expected to be suspicious o and to resent anything which would lead to the loss of their means o livelihood *i.e.* midwifery fees. It is to be hoped that though only sittin by as observers, they also may absorb anything of value in the method used and the instruction given. We have found it wise to let the villag women observe any African taboos in which they firmly believe, so long a these do no harm to the patient, even though they may entail a certai upset of conventional hospital routine. The mental distress caused to th patient and relatives by needless infringement of the taboos, only adds t the reluctance of village women to seek help or enter the hospital, and this is reflected in subsequent hesitation to send patients from the villages The women students at the Jeanes' are encouraged to discuss the different beliefs and taboos of the tribes from which they are drawn, and a endeavour is made to trace these beliefs to their probable origin. The European attitude to the same problem is presented and compared with their own, and so reason takes the place of superstition and the way is paved for midwifery instruction. We feel that this line of approach to the subject will have a more lasting impression, and that, in village talks, the women will pass on what they have heard to their relatives and friends in the villages. The following extract from a letter written by one of the former women students at the Centre, now resident in Angoniland, affords some proof of the field work of these Jeanes' women.

'I am kept busy with work among the village women, teaching them to keep cleaner houses and to look after their children; some listen and try to follow the example, others listen only, but they appreciate the work I am trying to do to help women in labour. They tell me I have something they would like to have and say "You must have had medicine inoculated in your hands at the Jeanes'. We want to buy it'.

This woman has delivered at least thirteen cases in her area, and the Superintendent of Education confirms the report that the people have great confidence in her. He also reports that her family and household are an example in the village.

Child welfare clinic

Attendances at the child welfare clinic have been regular throughout the year. Some of the mothers have been attending for at least five years, bringing with them each new addition to their family and have now lost their shyness. Children gain in weight steadily in the first months of their lives, when as a rule the feeding among the Yao tribes is breast milk only. Even the irregular feeding does not seem to affect their health seriously, apart from causing flatulence, and the chief ailments at this age seemed to be colds. Malaria seems to develop in the majority of cases after the sixth month, although one sudden death occurred of a child three months old with symptoms suggesting cerebral malaria. After the sixth month the children appear to have more set backs—frequent colds and coughs, teething troubles, unsuitable food and malarial infections, and, amongst the children in this area, this is the age at which most fatalities occur. It is uphill work trying to change established custom; but hardly more so than in the slums of Britain. It is hoped that the African woman trained at the Centre will face the difficulty in the spirit of the Native proverb "*Tsokonombwe adatha mtunda m'kulumpha*", "The grasshopper covers the ground in jumps", and finally achieve success. The addition of a small herd of cows to the establishment at the Jeanes' Centre, primarily for animal husbandry instruction, has been a great asset to the child welfare clinic. It has been possible to recommend and supply milk for those village children attending the clinic whose mothers have an insufficient supply of breast milk—useful propaganda on the value of cows' milk for the feeding of children. The toddlers in the students' families are now supplied with a quantity of milk daily during the forenoon".

Infant Welfare Work at the Missions.

Blantyre mission

The centre at the Church of Scotland Mission at Blantyre continued, under the inspiring influence of Dr. Janet Welch, to progress. Four women were trained as midwives during the year and three of these passed the examination set by the Medical Council and qualified for registration. New infant welfare centres were opened at Lunzu and Ntenjela, the clinics are regularly attended by the medical officer and are in charge of native midwives; treatment is confined at present to infants up to one year old.

The writer was particularly impressed with the maternity centre at Ntenjela. This consists of a small brick building with accommodation for 2-3 cases, it is in charge of a native midwife, who, under the supervision of the visiting doctor, manages the clinic and undertakes midwifery work. Since commencement, this centre has been most popular, it is clean and well kept and appears to be a particularly useful venture.

The Mlanda centre

The Mlanda Centre of the Dutch Reformed Church functioned satisfactorily although the medical officer in charge was on leave for the greater part of the year. This centre trains native midwives and several are already at work in the district. It is hoped during 1938 to place one of these women at one of the Government dispensary centres and so to continue in co-operation the two activities, thus forming a useful medical unit. All trained district midwives are supervised by the medical officer.

Livingstonia mission

During the year the grant of £350 per annum originally made to assist welfare work and nursing work amongst mothers and children at the Karonga mission station was, after consultation with, and agreement of, the mission concerned, distributed amongst the five centres where this particular class of work is being undertaken. The centres now benefiting from this grant are Karonga, Livingstonia, Bandawe, Loudon and Ekwendeni.

At Bandawe, the number of girls in training is stated to be 8, three are doing district work. The infant welfare clinic dealt with 3,805 attendances during the year. Owing to staff difficulties, little maternity work could be carried out. During the latter part of the year a medical officer was posted to this station. A table is given below showing the number of confinements attended to at Government hospitals and at mission institutions subsidized by Government.

	No. of infants admitted to welfare centre at hospital, on roll.	No. of infants admitted to district welfare centres, on roll.	Total No. of confinements			Infant deaths		
			Abnormal confinements.	Normal.	In the district.	Miscellaneous.	Stillbirths.	Maternal deaths.
Mlanda Mission	208	324	5	47	66	10	11	2
Blantyre Mission ...	142	63	31	153	253	—	72	9
Jeanes Centre	46	—	10	20	43	—	3	—
African Hospital Zomba ...	161	64	12	43	—	—	10	7
Other Government African Hospitals	—	—	46	19	—	—	—	8

SECTION VI. HOSPITALS AND DISPENSARIES.

European hospitals

Financial considerations still render the construction of a new hospital for Zomba impossible, in the meantime every effort has been made to keep the hospitals at Zomba and Blantyre in as good a condition as possible. A schedule of works amounting to some £900 has been prepared in respect of the institution at Zomba in the event of a new hospital not materialising. Applications for a hot water system and a water borne sewage disposal system have been made in connection with the Draft Estimates, 1938, for the Blantyre hospital. What is believed to be a somewhat hopeful sign is the appearance of the sum of £6,830 for a European hospital at Zomba in a " Schedule of Expenditure excluded from the Draft Estimates, 1938 ", but included in the works for which it is proposed to apply to the Secretary of State for sanction to finance from Surplus Balances. Actually a central institution to serve Zomba, Blantyre and Limbe would be an economical proposition and should provide better medical service and treatment facilities for the official and non-official population. In the Northern Province, the non-official European community clubbed together and provided a sum of money considered sufficient to construct a small cottage hospital at Lilongwe. Government has supported this excellent scheme of self-help and has promised to maintain and staff it.

Native hospitals

No new buildings have been erected and no additions have been made to existing institutions, during the year. As has been stated elsewhere * in this report the existence of small hospitals with a comparatively large and often highly paid staff at every station is uneconomical and, to a certain degree, inefficient, and, by immobilising to a great extent the single medical officer reduces the opportunity for rural preventive work to a minimum. Centralisation of staff and hospital accommodation at certain stations would result in increased economy, efficiency of working and in progress in the sanitation of the rural areas. Small station hospitals on the circumference of the district served by the central hospital would be decreased in size and utilized more in the nature of a ' feeder ' service than as separate entities.

At Blantyre, the mission hospital admits all African patients sent for in-patient treatment by the Government medical officer and receives a grant for this purpose.

Clerical staff, European health visitors and nursing sisters are lamentably deficient, and, in effect, this shortage of staff stifles all attempts at infant welfare and maternity work and the absence of European sanitary personnel stultifies the efforts of medical officers to impart instruction in hygiene and sanitation to the inhabitants of their districts.

It is however a fact, that, despite the lack of essential staff, the numbe of patients admitted to hospitals is still increasing as will be evidenced by the table below which gives a summary of the cases treated at native hospitals and rural dispensaries during 1937.

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* Vide Section II. Proposals for future development.

	1936			1937					
	Cases treated at Native Hospitals		Cases treated at Rural Dispensaries	Cases treated at Native Hospitals		Cases treated at Rural Dispensaries	Area in sq. miles	Rank of officer in charge	Density per square mile, 1931 Census
	In-Pts.	Out-Pts.	Out-Pts.	In-Pts.	Out-Pts.	Out-Pts.			
Blantyre and Neno ...	16	15,118	18,184	—	6,057	33,503	1,801	S.M.O.	B'tre85.64
Chikwawa	344	3,917	33,383	235	3,566	19,173	1,897	S.A.S.	18.92
Chiradzulu ...	556	6,769	18,625	505	5,009	12,559	270	S.A.S.	296.77
Cholo	880	4,657	5,485	759	3,950	3,878	624	M.O. or S.A.S.	94.79
Chinteche	475	11,896	8,918	483	8,035	10,328	1,925	Hosp. Asst.	23.06
Dowa	231	3,418	12,004	356	2,525	11,031	1,802	S.A.S.	64.41
Dedza	394	5,209	25,425	504	6,793	16,482	1,818	M.O.	76.06
Fort Johnston ...	650	9,355	7,191	778	9,364	5,335	2,518	M.O.	29.79
Fort Manning ...	380	3,107	14,620	359	3,961	13,217	1,453	S.A.S.	23.47
Karonga	751	9,098	24,457	739	8,858	23,499	3,004	M.O.	12.79
Kasungu	251	5,101	4.409	247	3,985	6,035	3,330	S.A.S. or H.A.	10.95
Kota Kota	485	12,536	18,325	651	14,904	21,812	2,430	M.O.	45.17
Lilongwe	262	4,811	7,921	521	4,964	8,623	2,677	M.O.	51.90
Liwonde	199	3,667	12,165	189	3,528	12,966	2,045	Hosp. Asst.	16.29
Mlanje	602	7,524	15,031	750	6,369	15,531	1,531	M.O.	27.89
Mzimba	157	4,034	13,869	215	4,156	13,128	5,729	M.O. & S.A.S.	30.73
Ncheu	341	7,405	13,628	475	6,338	15,288	1,092	Hosp. Asst.	69.22
Port Herald ...	439	2,621	13,277	644	3,620	15,440	747	M.O. or S.A.S.	108.98
Zomba African Hospital	1,819	10,038	30,340	1,949	15,072	39,360	903	M.O.	116.24
,, C. Prison Hospital	525	3,470	--	236	3,210	—	—	,,	—
,, Jeanes T. Centre	—	--	4,481	—	—	5,130	—	A. Mistress	—
Total ...	9,757	133,751	301,738	10,595	124,264	302,318	—	—	—

NOTE.—In the above table all patients attending for treatment are recorded in the first instance as out-patients whether or not they are subsequently admitted to hospital ; to obtain the total of those who obtained out-patient treatment only the in-patient figures should be subtracted from the combined total.

Rural dispensaries

There is a definite and growing demand for further medical facilities from the Native Authorities. In some cases, no doubt the applicant is spurred on by the fact that his neighbour possesses a dispensary and he does not, be that as it may, attendances are increasing, the standard of work is being gradually raised and the system occupies an important niche in the departmental programme of development. During the last 2 years some twenty-three applications for new dispensaries have been received and in some cases the local government (Native Authority) has been able to provide for the complete erection and maintenance of the unit and for payment of the native staff. Funds have been provided for the erection of some three or four new dispensaries in 1938. In one area, as a mark of appreciation of the work of the District Commissioner, the natives of his district made him a present (in the form of a sum of money) which, after obtaining the necessary authority, he donated to the district, to be utilised for the construction of two small dispensaries ; these were erected during the year under review. Two rural dispensaries are now provided with native midwives, who are the wives of the dispensers in charge ; this important step forward in preventive medicine if, carefully fostered and suitably directed, should, eventually, have far reaching results in the districts to which these women have been posted. Three women, wives of dispensers have now completed their training as midwives.

Some curious features of rural dispensary practice are revealed by a scrutiny of the dispensary returns, for example, during the year, 8,683 teeth were extracted and 4,223 intra-muscular and intra-venous injections were given. There still remains much to be done, there are still in certain districts backward, ignorant and poorly trained dispensers who are, for the most part, incapable of improvement, these will have to be gradually weeded out and replaced. With this end in view instruction is being carried out at the training school now well established at Zomba, the results of which should be evident in the course of the next few years by the higher standard and expansion of medical work performed in the rural areas.

SECTION VII. PRISONS AND ASYLUMS.

Prisons

There is little to comment upon in either of these institutions.

Generally, the Prison population has enjoyed a good record of health during the year, no outbreak of disease having occurred. At Kota-Kota Prison three cases of beriberi were reported, these have already been referred to in Section II.B. (General Diseases).

At Zomba, the new prisoners were all medically examined on admission and the following common infections were noted.

Total number examined ...	262
Infected with ankylostoma ...	166
Infected with *S. haematobium* ...	119
Malaria (various types, often double or triple infections) ...	82

The prisoners came from all parts of the country. A mild folliculitis of the scalp following on the use of razors for hair cutting and shaving and which had spread considerably was cured by the introduction of hair clippers.

One interesting phenomenon, which cannot yet be explained is the increase in the number of prisoners who have lost weight. The comparative figures foı 1936 and 1937 are:—

	1936	1937
Gained weight	59.57	59.11
Lost	6.52	29.96
Stationary	33.91	10.93

The matter will be further investigated.

Central lunatic asylum

As has been pointed out in previous Annual Reports, this institution is administered by the Chief Commissioner of Police with officers of the Prison Department. It would, it is suggested, be more correct for the Medical Department to be in executive control. The asylum itself is overcrowded, and the accommodation provided, chiefly of the cell type, is such as hardly to conduce to the restoration of a normal mental state. No treatment is possible.

Previous recommendations on this subject are now having a 'snowball' effect and Government has accepted, to a certain extent, the proposals made by a special committee appointed to enquire into the whole question.

Committee to enquire into the reception and treatment of native lunatics

The recommendations of this Committee were:—

(i) that plans of a modern mental hospital should be obtained both from England and other African territories;

(ii) that a site should be selected in the neighbourhood of the present asylum, sufficiently spacious to accommodate buildings capable of housing a minimum of 80 patients, (60 males and 20 females);

(iii) that a commencement should be made by erecting on the selected site one ward with its necessary appurtenances, to accommodate, say, fifteen of those patients who are most likely to derive benefit from decent association and proper treatment;

(iv) that in the initial stages of the change over from a lunatic asylum to a mental hospital, an experienced European asylum attendant should be engaged for whole time work;

(v) that as the new institution develops and when the needs of its administration justify the expense, a specialist medical officer should be employed as medical superintendent;

(vi) that a special hospital should be erected on the selected site, staffed by specially trained African attendants;

(vii) that the new mental hospital should be adequately staffed; that is, provision shall be made for every violent patient to be looked after by never less than 3 attendants, thus dispensing with the use of mechanical restraint, which is rightly regarded as harmful:

(viii) that an observation block be built, where suspected cases can be kept under continuous observation. The present practice of sending such cases to hospital where neither staff nor accommodation exists is to be condemned;

(ix) that the present asylum should be used only for violent and noisy cases or for those who for their own safety or for that of their fellows require some form of close confinement.

SECTION VIII. SCIENTIFIC.

(A) ANNUAL REPORT OF THE MEDICAL ENTOMOLOGIST FOR 1937.

I was on leave during the first eight months of the year, resuming duty on 5th September.

2 (*a*) **Tsetse surveys.** I spent fifteen days in November, carrying out a reconnaissance for tsetse fly in the Lilongwe, Dowa and Fort Manning districts which I had not visited since May of last year.

It showed that the situation continues to be satisfactory, for I did not succeed in finding any flies at all south of the telegraph line which runs across country in a direct line from east to west, either in the Dowa or the Fort Manning district, while the Lilongwe district seems at last to be entirely free of them. I encountered them sparingly, however, a mile or two to the north of the line in Dowa and at a still less distance from it in Fort Manning, while still farther north they were numerous in both districts.

The steady retreat of the flies in a northerly direction continues, therefore; for, about eighteen months ago when Mr. H. D. Burtt, the Botanist attached to the Department of Tsetse Research in Tanganyika Territory, made his survey the insects were everywhere south of this line. Since then, however, they have vacated, according to my estimate, approximately one hundred and fifty square miles while about four hundred square miles in all have been vacated since 1927 when their spread was at its maximum.

I noted that a small herd of cattle has recently been installed by natives north of the Mudi river in country which was formerly tsetse infested, which seems to indicate their faith in the present security of the situation.

(*b*) It cannot now be contended, I think, that the clearings and settlements that were originally effected, and general opening up of the regions to the south for tobacco any longer play a part in causing the continued diminution of the numbers of the flies, though it can hardly be questioned that these facts *were* responsible for bringing the advance, which had gone on for many years up to 1926, to an end, and were potent in ensuring for some years afterwards that the retreat of the insects still continued.

Other influences must now, it would seem, be at work, for the insects have recently disappeared from large tracts which carry a sparse human population, and in which little development is taking place.

Unless it be that natural agencies, such as parasites, have gained an ascendency over the flies, which I think improbable, the present falling off must be due in all probability, as it seems to me, to the present dearth of the animal life on which the insects depend for their food. Beyond puku and oribi, which are dambo-frequenting animals, and one small herd of waterbuck, I saw no antelope, while there was little evidence of their presence in the woodland. The District Commissioner at Fort Manning, indeed, expressed his conviction that shooting to the south of the Ludzi (the free area) is no longer worth while even for the native owing to the scarcity of game, which is rapidly diminishing in numbers to the north of the river also. The opinion expressed by Mr. Burtt in his report of July 1936, that game in the region south of the Ludzi where it was formerly abundant but was then exceedingly scarce, may also be recalled.

While in this region the opening up of three large estates undoubtedly conduced to the withdrawal of game, and the lessening of the numbers of the flies, it now seems to me, therefore, that the later policy of encouraging shooting may have been the eventual decisive factor. Shooting may still be playing its part, though now under licence, for I am informed by the District Commissioner of the Dowa district that, according to particulars furnished on fourteen returned game licences for the year under review, no fewer than 224 antelope alone were shot in the N. W. of the district, the tsetse-infested portion comprising approximately 360 square miles, while the Commissioner, Fort Manning informed me that thirty firearms are in the hands of natives in his district and twelve more are issued during the season when crops need protection—from November to April—the great majority for use in the north of the district. on area roughly 300 square miles, which the fly is now vacating, and that a lot of shooting goes on.

It is probable also that more animals are shot by natives than appear on the majority of their licences, while destruction by other means than shooting—by organized hunts in particular—of course goes on. The mere loosing off of firearms may play a greater part in scaring game away than the actual destruction, and it is the opinion current among natives in the districts that while comparatively few have been shot the greater number of the game animals have withdrawn to the reserve in the north.

There is ample evidence that game very soon learns to recognize localities in which it is immune from attack by man, to which it retires when harassed. One has only to instance, for example, the Reserve on the Athi Plains in Kenya with the railway line as the southern boundary. On the reserve side of the line game is abundant, but it is very scanty south of it where it is liable to be shot at. The numbers of the animals in the Kruger National Park, again, are said to be in striking contrast to the dearth of them in the environment.

The game in the districts concerned in Nyasaland can enjoy similar immunity from molestation in the Kasungu Reserve, and the probable explanation of the continued falling off in the numbers of the tsetse to the south now seems to me to be that they are gradually following up the game, the conditions being more favourable for them in the reserve, where they swarm, than outside it.

This assumption is supported by experience of the effect both on the game and the fly of the shooting that took place in about 1921 in the very heart of the fly area at Domira Bay where three estates were opened up for cotton. Five planters, one formerly a professional hunter of big game were concerned and shooting went on to the utmost limits afforded by their licences, so I gathered, for three years. At the end of this period one might walk the whole way from the lake to Matumbas, a distance of twelve miles, without seeing signs of any game at all even though the country-side had been thoroughly cleared by grass fires, while tsetses which had formerly been abundant were correspondingly absent. A herd of cattle were indeed brought in a couple of years after the estates had been opened up and were maintained in the neighbourhood till they closed down, while the Provincial Commissioner (who had had an experience of fly there for over twenty years) was so satisfied that it had gone that he put forward proposals for ox transport along the road. Game was at that time strictly preserved on the Lingadzi Estate of 15,000 acres some twelve miles to the north and was little shot at in the south of the Kota-Kota district beyond it, where it was abundant, and in these areas the tsetses remained and were exceedingly numerous. When the estates near Domira Bay were abandoned in about 1926 the game gradually returned, and with it the tsetse.

I believe, therefore, that the rifle is now playing the chief part in reclaiming the northern parts of the Dowa and the Fort Manning districts from the tsetse, the existence of the reserve being the other important factor.

3. **Survey for Parasites of the Tsetse in the Monkey Bay Fly Area.** I commenced a survey (which I propose to extend in due course to the Dowa—Fort Manning fly area) for parasites, with a view to ascertaining to what extent they are here responsible for the reduction of the numbers of the fly, for there has been a steady falling off in its numbers now for some years concomitant with a marked reduction of game.

The factors, other than the action of parasites, which may here be involved are the gradual moving inland of the chain of villages formerly on the outskirts of the fly area, consequent on the rise of the lake, and the opening up of gardens, the construction of a motor road through the southern half, and the opening of an hotel to which in the season there is a considerable flow of tourist traffic.

The following are the data obtained during the last three months of the year:—

Living puparia, and puparia from which tsetse had emerged ...	691
Puparia destroyed by Mutillids	11
Puparia destroyed by other parasites	27
	729

It does not appear, therefore, that parasites are playing an important part in the reduction of the fly in this area.

4. I continued a survey for rodents and their ectoparasites which necessarily proceeds slowly from the difficulty of getting honest work, since it is almost impossible to supervise it personally, from native collectors. It has been established, however, from determinations made by Dr. Austin Roberts of the Transvaal Museum, to whom the material was submitted through Dr. C. L. Fourie, the authority on plague and its vectors in the Union of South Africa, that the main reservoir in that country a gerbille, is here represented by a local form, *Taterona nyassae, shirensis*, occurring in communities in the sandy regions of the lake basin and Shire valley, but not in the hills so far as I have been able to ascertain, while *Mastomys coucha*, the principal intermediary in South Africa, is quite common here also. The black rat, *Rattus rattus alexandrinus* is of course ubiquitous, having ready access to the primitive grain stores in use by the native population.

Determinations of hundreds of rat fleas that were submitted to Dr. Karl Jordan, of the Tring Museum, showed that the very great majority were species of *Xenopsylla* (all of which are potential carriers of plague), *X. brasiliensis* and *X. pirici* being the most common, and included among them was one new to science but connecting to some extent *X. tortus* and *X. scopulifer*, taken off the rat *Saccostomus campestris, elegans*, Thos.

5. I commenced a study designed to ascertain whether *Mycobacterium tuberculosis* undergoes any morphological changes within the fly *Musca sorbens* and more especially whether the organisms remain viable after they have been ingested by the insect, and for how long: for the case against this fly as the possible transmitting agent of the closely-allied *M. leprae*, which I endeavoured to work out last year, would be greatly strengthened, as it seems to me, if it could be shown that the virulence of the former organism was not impaired by its sojourn within the insect.

Work involving the examination of hundreds of droplets of excreta from flies that had fed on tubercular sputum, the dissection of considerable numbers of them, and the utilization of the material so obtained on experimental animals was accordingly in progress during the last six weeks of the year.

6. I further established that the fly *M. sorbens* will ingest the bacteria found in the discharges from tropical ulcer, depositing them on any food material in the same way as it lays down the organisms productive of leprosy and tuberculosis. The observation may possibly explain the comparative frequency of such ulcers among the native population.

7. I continued my investigation of the breeding habits of Tabanidae, obtaining the larvae of two species additional to those referred to in my report for last year, in the same unusual habitat, rotholes in trees. It may here be noted perhaps, that as I surmised, the imagos that were then obtained proved to be new to science and were described during the year by Major E. E. Austin, D. S. O., in the Transactions of the Zoological Society, as *Sphecodomyia lamborni*, *S. secunda*, and *Hinca bicolor*, all being Pangoniines. The scientific value of the work lies primarily in the fact that it has thrown some light on the life histories of a group of biting flies about which very little has hitherto been known, though some of the better known species may be very common in certain localities.

8. The following paper was published during the year :—

"The haematophagous Fly *Musca sorbens*, Wied : in Relation to the Transmission of Leprosy ". (Journal of Trop. Med. and Hyg. 15th February, 1937).

29th January, 1938.

Sgd. W. A. LAMBORN,
Medical Entomologist.

(B) ANNUAL REPORT OF THE GOVERNMENT PATHOLOGIST, ZOMBA, 1937.

Staff.

The Government Pathologist : Dr. Horace M. Shelley.
African Laboratory Assistant : Mr. Rabson German.
Laboratory Assistant, 3rd Grade : Damson Boloweza.

Section 1. General Review of Work Done.

1. A total of 8,058 specimens were received for examination.

2. The Government Pathologist proceeded on leave in July, 1937, and the charge of the laboratory was taken over by Dr. C. H. Howat. During the latter months of the year only routine services were maintained, although as far as possible, all requests for laboratory assistance received attention.

Section 2. Buildings.

The remarks made in the past concerning the laboratory buildings still remain true. The building is inconvenient, and unsuitable in every way for use as a laboratory.

Section 3. Centres from which specimens were received.

Station	Number of specimens
Zomba	5,199
Cholo	411
Mlanje	320
Lilongwe	156
Blantyre	17
Karonga	3
Mkhoma	14
Fort Johnston	4
Blantyre Mission	109
Port Herald	18
Chikwawa	11
Chiradzulu	98
Limbe	16
Veterinary Department	2
Kota-Kota	3
Likoma	3
Fort Jameson	2
Dowa	3
Dedza	849
Ncheu	1
Liwonde	733

Section 4. Pathological Specimens.

(A) *Urine.* 1,078 specimens of urine were examined, and of this number, 219 contained evidence of bilharzial infestation. Urea estimations were made in three cases, and glucose and albumen estimations in two.

(B) *Faeces.* 1,396 specimens were examined, with the undermentioned results :—

Negative examinations	707
Positive examinations	689
Positive for Hookworm	520
,, ,, *S. mansoni*	37
,, ,, Ascaris	27
,, ,, Trichuris	1
,, ,, Strongyloides	9
,, ,, *E. histolytica*	88
,, ,, *E. coli*	5
,, ,, Giardia	2

(C) *Blood Specimens.* The undermentioned examinations were made :—

Films for parasites	4,827		
Films positive	1,383	*P. falciparum*	1,154
		P. vivax	36
		P. malariae	189
		T. duttoni	4
Sachs-Georgi tests	327	Negative 183	
Complete blood counts	13		
Differential counts	8		
Reticulocyte counts	1		
Blood groupings	2		
Arneth counts	6		
Transfusions	1		
Widal tests	4		
Blood cultures	4		
Blood sugar estimation	1		
Blood urea estimations	2		
Sedimentation test	1		
Van den Bergh test	1		
Haemoglobin estimations	10		

(D) *Miscellaneous examinations.*

Pus smears and ulcer scrapings	146		
Sputa for acid fast bacilli ...	89	Positive	19
Cerebro-spinal fluids ...	15		
Throat swobs for suspected diphtheria	7	Negative	7

Section 5. Histological Examination of Tissues.

Eighteen tissues were examined with the undermentioned results :—

Hypertrophied clitoris	1
Fibromata	2
Chronic pyogenic inflammation	2
Mucous cyst of mouth	1
Dermoid tumour	1
Endothelioma	1
Mixed parotid tumours	2
Chronic appendicitis	1
Lipoma	1
Papilloma	1
Filariasis of epididymis	1
Fibroadenoma of breast	1
Melanotic carcinoma	1
Elephantiasis	1
Myeloid leucaemia (spleen)	1

Section 6. Autopsies. (Excluding those of a medico-legal nature).

Six autopsies were performed during the year, the causes of death being as follows :—

Lobar pneumonia	1
Influenzal pneumonia	1
Relapsing fever	1
Pneumococcal meningitis	1
Spongoblastoma of cerebellum	1
Lenticular degeneration	1

Section 7. Medico-legal Examinations.

Examination of stains for blood	23
Precipitin tests for human blood ...	17
Analyses of viscera etc., for alleged poisons ...	39
Autopsies	7

The causes of death in the seven cases above-mentioned were as follows :—

Pneumonia	3
Electrocution	1
Homicidal assault	1
Drowning	1
Suicidal hanging	1

Section 8. Suggestions.

The employment of a European or an Asiatic laboratory assistant is necessary, if it is the desire to extend the work of the laboratory. The volume of work has now reached such proportions that it is no longer possible to examine each specimen with such thoroughness as formerly. The analyses of viscera for poisons occupy a large part of the Pathologist's time, and necessitate the performance of a large amount of technical work, apart from actual medical work. The African laboratory assistant renders valuable help, and has proved very efficient, but a large proportion of his time is occupied with clerical work, maintaining the specimen registers, and writing reports to dictation.

Returns.

TABLE I. STAFF.

EUROPEAN.

A. D. J. B. Williams, O.B.E.,	Director of Medical Services.
H. H. B. Follit	Senior Health Officer (Retired from service with effect from 16. 11. 1937).
W. A. S. Lamborn, O.B.E.,	Medical Entomologist.
R. Calleja	Senior Medical Officer.
H. M. Shelley	Pathologist.
H. G. FitzMaurice	Medical Officer.
T. A. Austin	,, ,,
W. H. Watson	,, ,,
W. L. Gopsill	,, ,,
R. Nicklin	,, ,, Transferred from Zanzibar with effect from 18. 9. 1937.
F. O. W. A. Mahon-Daly	Medical Officer.
P. J. Bourke	,, ,,
L. C. Mayne	,, ,,
R. N. Wilcox	,, ,,
E. J. Blackaby	,, ,, Transferred to Zanzibar with effect from 26. 6. 1937.
D. P. Turner	Medical Officer.
H. D. Cronyn	,, ,,
C. H. Howat	,, ,,
A. T. D. Whitfield	,, ,,
W. T. C. Berry	,, ,,
Miss N. M. Cremen, M.B.E.,	Matron. Promoted Matron with effect fron 1. 9. 1936.
Miss H. M. Phillips	Nursing Sister.
Mrs. N. K. Clemence	,, ,,
Miss M. E. S. Cumming	,, ,,
Miss H. C. Potter	,, ,, Resigned with effect from 11. 12. 1937
Miss B. Wells	,, ,, Resigned with effect from 14. 10. 1937
Miss E. M. R. D. Davies	,, ,,
Miss R. P. Harrison	,, ,,
Miss E. Irving	,, ,,
Miss M. Gibson	,, ,, Resigned with effect from 30. 10. 1937
Miss S. Barber	,, ,,
Miss M. Arnot	,, ,, Appointed with effect from 15. 10. 1937
R. W. G. Pegg	Office Superintendent and Medical Storekeeper Title changed with effect from 1. 1. 1937.
V. T. Smithyman	Junior Clerk (Temporary).
W. A. Willox	Sanitary Superintendent.
F. L. Chapman	,, ,,
E. H. Croghan	,, ,, (Temporary relief with effec from 5. 4. 1937).

ASIATIC.

B .T. Lele	Civil Sub Assistant Surgeon.
Lakhpat Singh	,, ,, ,, ,,
S. S. Kokari	,, ,, ,, ,,
G. K. Joshi	,, ,, ,, ,,
Badri Prasad M.B.E.,	,, ,, ,, ,, with effect from 19. 3. 1937. Previously seconded from Indian Medical Dept.
P. D. Jhala	Civil Sub Assistant Surgeon. Temporary, with effect from 1. 9. 1937.
G. D. Kashap	Subadar. I.M.D., Sub Assistant Surgeon.
Bansi Lal	Jemadar I.M.D., Sub Assistant Surgeon.
Lachhman Das	,, ,, ,, ,, ,,
Sohan Singh Pannum	,, ,, ,, ,, ,,

AFRICAN.

*Leonard Makolera	Hospital Assistant, First Grade.
Moses Kaunde	,, ,, ,, ,,
*Godwin Maulidi	,, ,, ,, ,,
Elliott Taumbe	,, ,, ,, ,,
Dyson David	,, ,, ,, ,,
*Fred Nyirenda	,, ,, ,, ,,
E. G. Hoare	,, ,, ,, ,,
Harry M. Thomson	,, ,, ,, ,,
Radford Botha	,, ,, ,, ,,
*Dan Ngurube	,, ,, ,, ,,
J. H. T. Chirwa	,, ,, Junior Grade. Resigned with effect from 31. 7. 1937.
J. B. Wachepa	,, ,, Junior Grade.
G. Ndovi	,, ,, ,, ,,
R. C. Undi	,, ,, ,, ,,
Kenan W. Mkandawire	,, ,, Appointed with effect from 1. 8. 1937.
Aliyefu T. M. Mkisi	,, ,, Junior Grade. Appointed with effect from 11. 8. 1937.
Hudson B. Chamba	Clerk, Super Grade. Promoted with effect from 1. 1. 1937.
Isaiah M. Jere	,, First Grade.
E. E. Mothello	,, ,, ,,
James F. Sangala	,, ,, ,,
MacAuslin Chemboga	Sanitary Inspector, First Grade.

* Passed examination for Senior Hospital Assistant.

TABLE II.—FINANCIAL.

(See Section I. C.).

TABLE III.

RETURN OF STATISTICS OF POPULATION FOR THE YEAR 1937.

	Europeans and Whites	Africans	Asiatics
Number of Inhabitants 1937	1,894	1,635,804	1,631
Number of Births ,,	29	Not known	83
Number of Deaths ,,	18	Not known	19
Number of Immigrants ,,	—	—	—
Number of Inhabitants 1936	1,838	1,619,530	1,558
Increase of population	56	16,274	73
Decrease of population	—	—	—

TABLE IV.

Showing the Maximum, Minimum, and Mean Temperatures (Fahr.) and Total Rainfall in Various District during the Year 1937.

District.	Station.	Height above Sea Level.	Air Temperature.							Rain.			
			Means of		Means of	Absolute Max. and Min.				Number of Days.	Total Fall Inches.	Maximum Fall in a Day.	
			A Max.	B Min.	A & B	Max.	Date.	Min.	Date.			Inches.	Date.
		Feet.											
Lower Shire	Port Herald	115	89·4	68·9	73·2	106	19 Dec.	47	22 June	68	25·08	3·64	14 Feb.
,, ,, ...	Port Herald Experimental Station	130	90·7	67·4	79·0	113·5	15 Nov.	47	23 ,,	76	26·89	3·64	14 ,,
Chikwawa	Chikwawa	127	90·0	66.2	78·1	120	15 ,,	42	13 Aug.	65	26·41	2·18	15 ,,
Cholo	Cholo	3,000	—	54·5	—	—	—	54	29 June	97	53·88	2·80	17 Nov.
Mlanje	Mlanje	2,400	—	—	—	—	—	—	—	86	85·07	7·58	1 Jan.
Blantyre	Blantyre	3,500	79·1	61·0	70·0	95	14 Nov.	44	24 June	69	45·78	3·89	11 ,,
Zomba	Zomba	3,020	78·9	60·7	69·9	95	15 ,,	46	23 ,,	98	48·43	3·16	2 ,,
Ncheu	Ncheu	3,700	81·8	59·5	70·7	98	10 ,,	44	25 ,,	76	33·74	2·11	21 ,,
South Nyasa	Fort Johnston	1,700	88·8	60·2	74·5	104	23 ,,	38	30 ,,	52	27·63	2·13	16 Feb.
Dedza	Dedza	5,250	73·0	—	—	86	24 ,,	—	—	51	39·33	3·50	31 Dec.
Lilongwe	Lilongwe	3,400	80·2	—	—	98	2 Jan.	—	—	70	39·09	3·90	26 ,,
Fort Manning	Fort Manning	4,228	84·9	55·4	70·2	100	16 Nov.	40	28 July	89	28·49	2·85	13 Jan.
Kasungu	Kasungu	3,500	86·0	55·0	70·8	102	18 ,,	38	23 ,,	83	39·74	2·31	12 ,,
Dowa	Dowa	4,400	79·9	71·3	75·6	95	24 ,,	51	5 May	71	37·66	2·05	26 Dec.
Dowa	Domira Bay	2,000	83·3	62·4	72·9	98	19 Dec.	40	23 June	90	33·99	3·32	1 April
Kota Kota	Kota-Kota	1,800	93·4	—	—	104	15 Nov.	—	—	85	44·26	2·02	15 Jan.
Mzimba	Mzimba	4,500	74·8	53·9	64·4	88	16 ,,	35	29 Aug.	64	28·49	1·94	24 Feb.
West Nyasa	Chinteche	1,800	88·1	62·2	75·2	103	4 ,,	48	27 June	74	50·51	3·97	8 March
North Nyasa	Karonga	1,800	—	—	—	—	—	—	—	60	41·61	4·44	9 ,,

TABLE V.

TABLE Va.—ZOMBA AND BLANTYRE EUROPEAN HOSPITALS.
RETURN OF DISEASES AND DEATHS (EUROPEAN IN-PATIENTS) FOR THE YEAR 1937.

Diseases.	Remaining at the end of 1936	Admissions during 1937		Total Cases Treated	Deaths	Remaining at the end of 1937
		Zomba	Blantyre			
I. *Epidemic, Endemic and Infectious Diseases :*						
5. Malaria :—						
(*a*) Tertian (benign) ...	1	—	4	5	—	—
(*c*) Aestivo-autumnal (sub-tertian, malignant)	—	1	1	2	—	1
(*e*) Blackwater fever ...	—	—	1	1	1	—
(*f*) Undefined ...	—	4	14	18	—	—
10. Diphtheria ...	—	—	1	1	1	—
11. Influenza ...	—	—	4	4	—	—
16. Dysentery :—						
(*a*) Amoebic ...	2	14	15	31	1	1
(*c*) Undefined ...	—	—	6	6	—	—
31. Tuberculosis, pulmonary and laryngeal ...	—	1	—	1	—	—
38. Syphilis :—						
Secondary ...	—	1	—	1	—	—
II. *General Diseases not mentioned above :*						
44. Cancer or other malignant tumours of the stomach or liver ...	—	—	1	1	—	—
45. Cancer or other malignant tumours of the peritoneum, intestines, rectum ...	—	—	1	1	1	—
49. Cancer or other malignant tumours of organs not specified ...	—	—	1	1	—	—
50. Tumours (non-malignant) :—						
Cyst ...	—	1	1	2	—	—
Papilloma ...	—	—	1	1	—	—
57. Diabetes (not including insipidus)	—	—	1	1	—	—
66. Alcoholism ...	—	—	1	1	—	—
III. *Affections of the Nervous System and Organs of the Senses :*						
74. Apoplexy :—						
Thrombosis ...	—	—	1	1	—	—
75. Paralysis :—						
Hemiplegia ...	—	—	1	1	—	—
77. Other forms of mental alienation :—						
Dementia ...	—	—	2	2	—	—
82. B. Neuritis ...	—	1	1	2	—	—
C. Neurasthenia ...	—	—	1	1	—	—
85. Diseases of the eye and annexa :—						
Foreign body ...	—	1	—	1	—	—
86. Affections of the ear and mastoid sinus :—						
Mastoiditis ...	—	1	—	1	—	—
Other diseases ...	—	1	—	1	—	—
IV. *Affections of the Circulatory System :*						
90. Other diseases of the heart :—						
Myocarditis ...	—	—	1	1	—	—
Carried forward	3	26	60	89	4	2

TABLE Va—Continued.

Diseases.	Remaining at the end of 1936	Admissions during 1937		Total Cases Treated	Deaths	Remaining at the end of 1937
		Zomba	Blantyre			
Brought forward ...	3	26	60	89	4	2
91. Diseases of the arteries :—						
(*b*) Arterio-sclerosis ...	1	—	1	2	—	—
(*c*) Other diseases ...	—	—	1	1	—	—
93. Diseases of the veins :—						
Haemorrhoids ...	—	1	—	1	—	—
Phlebitis ...	1	—	—	1	—	—
					—	—
V. *Affections of the Respiratory System* :						
97. Diseases of the nasal passages :—						
Coryza ...	—	1	—	1	—	1
99. Bronchitis :—						
Acute ...	—	1	1	2	—	2
100. Broncho-pneumonia ...	—	—	1	1	1	—
101. Pneumonia :—						
Lobar	—	1	—	1	—	—
102. Empyema ...	—	2	—	2	1	—
105. Asthma ...	—	—	1	1	—	—
VI. *Diseases of the Digestive System* :						
108. A. Diseases of the buccal cavity and annexa :—						
Dental caries ...	—	1	—	1	—	—
109. Affections of the pharynx or tonsils :—						
Pharyngitis ...	—	—	1	1	—	—
Enlargement of tonsil ...	—	1	—	1	—	—
Tonsillitis ...	—	8	—	8	—	—
Other diseases of the pharynx or tonsils ...	—	—	1	1	—	—
112. Other affections of the stomach :—						
Gastritis ...	1	1	3	5	—	—
113. Diarrhoea and enteritis :—						
Under two years ...	—	1	—	1	—	—
114. Diarrhoea and enteritis :—						
Two years and over ...	—	2	2	4	—	—
Colic ...	—	1	—	1	—	—
Colitis ...	—	—	1	1	—	—
117. Appendicitis ...	1	3	12	16	1	—
118. Hernia :—						
Femoral ...	—	1	—	1	—	—
Inguinal ...	—	1	1	2	—	—
119. A. Affections of the anus :—						
Fistula ...	—	2	—	2	—	—
B. Other affections of the intestines :—						
Constipation ...	—	2	1	3	—	—
124. Other affections of the liver :—						
Hepatitis ...	1	—	—	1	—	—
VII. *Diseases of the Genito-urinary System* (*non-venereal*) :						
129. Chronic nephritis ...	—	1	—	1	—	—
130. B. Schistosomiasis ...	—	—	1	1	—	—
131. Other affections of the kidneys :—						
Pyelitis ...	—	3	2	5	—	1
Haematuria (non-Bilharzial)	—	1	—	1	—	—
132. Urinary calculus ...	—	—	1	1	—	—
135. Diseases of the prostate :—						
Hypertrophy ...	—	1	—	1	—	—
Prostatitis .	—	—	1	1	—	—
Carried forward ...	8	62	92	162	7	6

TABLE Va.—Continued.

Diseases.	Remaining at the end of 1936	Admissions during 1937. Zomba	Admissions during 1937. Blantyre	Total Cases Treated.	Deaths.	Remaining at the end of 1937
Brought forward	8	62	92	162	7	6
136. Diseases (non-venereal) of the genital organs of man :—						
Phimosis ...	—	1	—	1	—	—
140. Uterine haemorrhage (non-puerperal) ...	—	—	1	1	—	—
141. A. Metritis ...	—	—	2	2	—	—
B. Other affections of the female genital organs :—						
Displacements of the uterus	—	1	—	1	—	—
Leucorrhoea ...	—	1	—	1	—	—
Menorrhagia ...	—	1	—	1	—	—
VIII. *Puerperal State* :						
143. A. Normal labour ...	—	4	7	11	—	—
B. Accidents of pregnancy :—						
(*a*) Abortion ..	—	1	4	5	—	1
(*b*) Ante-partum haemorrage . .	—	—	1	1	—	—
IX. *Affections of the Skin and Cellular Tissues* :						
152. Carbuncle ...	—	—	1	1	—	—
153. Abscess :—						
Whitlow ...	—	1	1	2	—	—
Cellulitis ...	—	3	2	5	—	—
155. Other diseases of the skin ...	—	—	2	2	—	—
X. *Diseases of Bones and Organs of Locomotion* (*non-Tuberculous*) :						
157. Diseases of the joints :—						
Arthritis ...	—	—	1	1	—	—
XIV. *Affections Produced by External Causes* :						
175. Suicide (attempted) by poisoning	—	—	2	2	—	—
176. Attacks of poisonous animals :—						
Insect-bite	—	1	—	1	—	—
179. Burns (other than by fire) ...	—	1	—	1	—	—
185. Wounds (by fall) ...	—	4	1	5	—	—
201. C. Fracture ...	1	2	3	6	—	—
202. Other external injuries :—						
Bruises ...	—	—	6	6	—	—
Foreign body (except eye) ...	—	—	1	1	—	—
Unclassified ...	—	—	1	1	—	1
XV. *Ill-Defined Diseases* :						
205. A.—Diseases not already specified or ill-defined :—						
Shock ...	1	—	—	1	—	—
Pyrexia of uncertain origin...	—	2	—	2	—	—
Total ...	10	85	128	223	7	8

TABLE V.

Table Vb. Return of Diseases and Deaths (Native In-Patients) for the Year 1937.

(Including Asiatics, Native Officials, K. A. R. Native Ranks, Native General Population, Asiatic and Native Convicts).

Diseases.	Remaining at the end of 1936	Admissions during 1937	Total Cases Treated	Deaths	Remaining at the end of 1937
I. *Epidemic, Endemic and Infectious Diseases* :					
1. Enteric group :—					
Type not defined ...	—	1	1	—	—
3. Relapsing fever ...	5	91	96	1	3
5. Malaria :—					
(*a*) Tertian (benign) ...	—	92	92	—	3
(*b*) Quartan ..	—	32	32	1	1
(*c*) Aestivo-autumnal (sub-tertian, malignant)	10	517	527	16	17
(*d*) Cachexia (chronic) ...	—	46	46	2	3
(*f*) Undefined ...	7	347	354	3	7
6. Smallpox ...	1	1	2	—	—
7. Measles ...	3	42	45	1	—
9. Whooping cough (pertussis) ...	1	28	29	3	—
11. Influenza ...	1	64	65	1	1
13. Mumps ...	—	5	5	—	1
16. Dysentery :—					
(*a*) Amoebic ...	3	85	88	4	3
(*b*) Bacillary ...	—	4	4	—	—
(*c*) Undefined or due to other causes ...	—	13	13	1	—
20. Leprosy ...	4	38	42	2	3
21. Erysipelas ...	—	5	5	—	—
23. Encephalitis lethargica (sleepy sickness) ...	—	2	2	—	—
24. Epidemic cerebro-spinal fever ..	—	29	29	8	2
25. Other epidemic diseases :—					
Rubeola ...	1	2	3	—	—
Varicella ...	—	42	42	—	—
Rat bite fever ...	—	1	1	—	—
Epidemic dropsy ...	1	—	1	—	—
Yaws ...	5	356	361	1	10
Trypanosomiasis ...	—	1	1	—	—
29. Tetanus ...	—	2	2	1	—
30. Mycosis ...	—	5	5	—	—
31. Tuberculosis, pulmonary and laryngeal ...	6	99	105	19	12
33. Tuberculosis of the intestines or peritoneum ...	1	11	12	2	1
34. Tuberculosis of the vertebral column ...	1	6	7	—	—
35. Tuberculosis of bones and joints ...	3	20	23	1	1
36. Tuberculosis of other organs :—					
(*a*) Skin or subcutaneous tissue (Lupus) ...	—	3	3	—	—
(*b*) Lymphatic system ...	3	15	18	—	1
(*c*) Genito-urinary ...	1	—	1	—	—
38. Syphilis :—					
(*a*) Primary ...	13	282	295	3	12
(*b*) Secondary ...	30	460	490	4	24
(*c*) Tertiary ...	4	100	104	—	4
(*d*) Hereditary ...	2	54	56	4	1
(*e*) Period not indicated ...	3	30	33	—	2
39. Soft chancre ...	—	9	9	—	6
40. A. Gonorrhoea and its complications ...	9	232	241	4	11
B. Gonorrhoeal ophthalmia ...	—	1	1	—	—
C. „ arthritis ...	—	3	3	—	—
41. Septicaemia—Blood poisoning ...	1	2	3	2	—
42. Other infectious diseases :—Filariasis ...	—	1	1	—	—
II. *General Diseases not mentioned above* :					
43. Cancer or other malignant tumours of the buccal cavity ...	1	1	2	—	—
44. Cancer or other malignant tumours of the stomach or liver ...	—	2	2	1	—
Carried forward	120	3,182	3,302	85	129

TABLE Vb.—Continued.

Diseases.	Remaining at the end of 1936	Admissions during 1937	Total Cases Treated	Deaths	Remaining at the end of 1937
Brought forward	120	3,182	3,302	85	129
45. Cancer or other malignant tumours of the peritoneum, intestines, rectum ...	—	1	1	1	—
47. Cancer or other malignant tumours of the breast .	—	2	2	—	2
48. Cancer or other malignant tumours of the skin ...	1	6	7	—	1
49. Cancer or other malignant tumours of organs not specified ...	1	19	20	2	2
50. Tumours (non-malignant) :—					
Adenoma ...	—	18	18	—	2
Lipoma ...	—	6	6	—	—
Cyst ...	1	20	21	—	1
Dermoid cyst ...	—	2	2	—	—
Fibroma ...	—	3	3	—	—
Osteoma ...	—	1	1	—	—
Papilloma ...	—	2	2	—	—
Polypus ...	—	1	1	—	—
Unspecified ...	—	13	13	2	1
51. Acute rheumatism (Rheumatic fever) ...	—	5	5	1	—
Sub-acute rheumatism ...	—	2	2	—	—
52. Chronic rheumatism :—					
Rheumatic arthritis ...	1	50	51	1	4
53. Scurvy ...	—	3	3	—	—
54. Pellagra ...	4	17	21	—	4
55. Beri-beri ...	—	6	6	—	1
56. Rickets ...	—	2	2	—	—
57. Diabetes (not including insipidus) ...	—	1	1	—	—
58. Anaemia :—					
Other anaemias ...	1	13	14	1	—
60. Diseases of the thyroid gland :—					
(*a*) Exophthalmic goitre ...	—	2	2	—	—
(*b*) Other diseases of the thyroid gland ...	1	6	7	1	—
61. Diseases of the para-thyroid glands :—					
Tetany ...	—	1	1	—	—
64. Diseases of the spleen :—					
Splenitis ...	—	1	1	—	—
Other diseases of the spleen ...	—	2	2	—	—
66. Alcoholism ...	—	1	1	—	—
67. Chronic poisoning by mineral substances ...	—	1	1	1	—
II. *Affections of the Nervous System and Organs of the Senses* :					
70. Encephalitis (not including encephalitis lethargica) ...	1	—	1	—	—
71. Meningitis (not including tuberculous or cerebro-spinal meningitis) ...	—	7	7	3	—
73. Other diseases of the spinal cord :—					
Myelitis ...	—	2	2	—	1
Spastic paraplegia	—	2	2	—	—
75. Paralysis :—					
(*a*) Hemiplegias ...	1	16	17	—	1
(*b*) Other paralyses ...	2	14	16	2	2
77. Other forms of mental alienation :—					
Dementia ...	—	1	1	—	—
Melancholia ...	—	1	1	—	—
Mania ...	1	—	1	—	—
Idiocy ...	—	7	7	—	1
Delusional insanity ...	—	5	5	—	1
Other mental diseases ...	1	4	5	—	1
78. Epilepsy	4	41	45	1	2
80. Infantile convulsions ...	—	1	1	1	—
81. Chorea ...	—	3	3	—	1
Carried forward	140	3,493	3,633	102	157

TABLE Vb—Continued.

Diseases.	Remaining at the end of 1936	Admissions during 1937	Total Cases Treated	Deaths	Remaining at the end of 1937
Brought forward	140	3,493	3,633	102	157
82. A. Hysteria ...	—	2	2	—	—
B. Neuritis ...	1	7	8	—	—
C. Neurasthenia ...	—	1	1	—	—
E. Intercostal neuralgia	—	1	1	—	—
F. Migraine	—	1	1	—	—
G. Neuralgia	—	14	14	—	1
H. Sciatica ...	—	11	11	—	1
84. Other affections of the nervous system :—					
Paralysis agitans ...	1	4	5	—	1
Brain tumour ...	—	2	2	1	—
85. Diseases of the eye and annexa :—					
Blepharitis ...	—	5	5	—	1
Cataract ...	1	12	13	—	—
Chalazion ...	—	1	1	—	—
Conjunctivitis ...	5	182	187	—	6
Foreign body ...	—	10	10	—	—
Glaucoma ...	—	2	2	—	—
Optic neuritis ...	—	2	2	—	—
Ulcer of cornea ...	1	45	46	—	2
Trachoma ...	—	1	1	—	—
Other diseases ...	5	33	38	—	3
86. Affections of the ear and mastoid sinus :—					
Mastoiditis ...	1	3	4	—	—
Otorrhoea ...	—	11	11	—	—
Otitis ...	—	23	23	—	—
Other diseases ...	—	4	4	—	—
IV. *Affections of the Circulatory System* :					
87. Pericarditis ...	2	1	3	—	—
88. Acute endocarditis ...	—	2	2	1	—
89. Angina pectoris ...	—	3	3	—	—
90. Other diseases of the heart :—					
(*a*) Valvular-Mitral ...	2	9	11	1	—
Aortic ...	—	4	4	—	—
(*b*) Myocarditis ...	—	3	3	—	1
(*c*) Disordered action of the heart :—					
Bradycardia ...	—	8	8	1	1
Tachycardia ...	1	7	8	—	—
91. Diseases of the arteries :—					
Aneurysm ...	—	1	1	1	—
92. Embolism or thrombosis (non-cerebral) ...	—	1	1	—	—
93. Diseases of the veins :—					
Haemorrhoids ...	—	12	12	—	1
Varicose veins and varicocele	1	11	12	—	—
Phlebitis ...	—	3	3	—	—
94. Diseases of the lymphatic system :—					
Lymphangitis ...	—	14	14	1	—
Lymphadenitis, bubo (non-specific) ...	1	20	21	—	2
95. Haemorrhage of undetermined cause :—					
Epistaxis ...	—	1	1	—	—
V. *Affections of the Respiratory System* :					
97. Diseases of the nasal passages :—					
Adenoids ...	—	1	1	—	—
Polypus ...	1	3	4	—	—
Rhinitis ...	—	1	1	—	—
Coryza ...	1	9	10	—	1
Sinusitis ...	—	8	8	—	—
Carried forward	164	3,992	4,156	108	178

TABLE Vb.—Continued.

Diseases.	Remaining at the end of 1936	Admissions during 1937	Total Cases Treated	Deaths	Remaining at the end of 1937
Brought forward	164	3,992	4,156	108	178
98. Affections of the larynx :—					
Laryngitis ...	1	2	3	—	1
99. Bronchitis :—					
(*a*) Acute ...	8	176	184	2	3
(*b*) Chronic ...	3	20	23	1	—
Bronchiectasis ...	—	1	1	—	—
100. Broncho-pneumonia ...	—	58	58	11	1
101. Pneumonia :—					
(*a*) Lobar ...	4	108	112	18	3
(*b*) Unclassified ...	1	1	2	—	—
102. Pleurisy :—					
(*a*) Empyema ...	—	10	10	2	—
(*b*) Other pleurisies ...	—	38	38	2	—
103. Congestion of the lungs ...	—	1	1	1	—
105. Asthma ...	—	34	34	—	—
107. Other affections of the respiratory system :—					
Pleurodynia ...	—	2	2	—	—
Haemoptysis ...	—	1	1	—	—
VI. *Diseases of the Digestive System:*					
108. A. Diseases of the buccal cavity and annexa :—					
Alveolar abscess ...	—	10	10	—	1
Dental caries ...	—	12	12	—	—
Pyorrhoea ...	—	10	10	—	—
108. B. Stomatitis ...	—	22	22	—	—
Glossitis ...	—	5	5	—	—
Ludwig's angina ...	—	2	2	—	—
109. Affections of the pharynx or tonsils :—					
Pharyngitis ...	—	15	15	—	1
Vincent's angina ...	—	5	5	—	—
Enlargement of tonsil ...	—	2	2	—	—
Tonsillitis ...	2	23	25	—	1
Other diseases of the pharynx or tonsils ...	—	1	1	—	—
111. A. Ulcer of the stomach ...	—	1	1	—	—
112. Other affections of the stomach :—					
Gastritis ...	1	12	13	—	—
Dyspepsia ...	1	13	14	—	—
Haematemesis	—	2	2	1	—
113. Diarrhoea and enteritis :—					
Under two years ...	—	21	21	1	—
114. Diarrhoea and enteritis :—					
Two years and over ...	—	47	47	1	1
Colic ...	—	8	8	—	—
Colitis ...	1	6	7	—	—
115. Ankylostomiasis ..	70	1,173	1,243	16	62
116. Diseases due to intestinal parasites :—					
(*a*) Cestoda—Taenia ...	—	9	9	—	—
(*b*) Nematoda (other than ankylostoma) :—					
Ascaris ...	1	53	54	1	2
Strongylus ...	1	—	1	—	—
Oxyuris ...	—	1	1	—	—
117. Appendicitis ...	—	8	8	—	1
118. Hernia :—					
(*a*) Femoral	—	2	2	—	—
(*b*) Inguinal ...	5	39	44	1	2
(*c*) Umbilical ...	—	1	1	—	—
(*d*) Unspecified ...	—	4	4	—	—
Carried forward	263	5,951	6,214	166	257

TABLE–Vb.–Continued.

Diseases.	Remaining at the end of 1936	Admissions during 1937	Total Cases Treated	Deaths	Remaining at the end of 1937
Brought forward	263	5,951	6,214	166	257
119. A. Affections of the anus :—					
Fistula	—	4	4	—	1
Fissure of anus	1	—	1	—	—
Prolapse of rectum	2	8	10	—	—
B. Other affections of the intestines (included under 119) :—					
Constipation	1	80	81	—	1
Other affections	—	1	1	1	—
122. Cirrhosis of the liver :—					
(*a*) Alcoholic	1	4	5	2	1
(*b*) Other forms	—	4	4	—	1
124. Other affections of the liver: —					
Abscess	—	3	3	1	1
Hepatitis	—	11	11	3	2
Cholecystitis	1	—	1	—	—
Jaundice	—	18	18	3	—
126. Peritonitis(of unknown cause)	—	3	3	2	—
VII *Diseases of the Genito-urinary System* (*non-venereal*) :					
128. Acute nephritis	—	9	9	1	—
129. Chronic nephritis	1	7	8	1	—
130.B. Schistosomiasis	24	513	537	2	26
131. Other affections of the kidneys :—					
Pyelitis	—	12	12	1	—
Haematuria (non-Bilharzial)	—	1	1	—	—
132. Urinary calculus	—	1	1	—	—
Renal calculus	—	1	1	—	1
133. Diseases of the bladder :—					
Cystitis	—	14	14	1	—
Incontinence of urine	1	1	2	—	—
Retention of urine	—	5	5	1	—
134. Diseases of the urethra :—					
Stricture	—	2	2	—	—
Abscess	—	1	1	—	—
Vesico-vaginal fistula	—	3	3	1	—
Other diseases	—	6	6	—	—
136. Diseases (non-venereal) of the genital organs of man :—					
Epididymitis	—	8	8	—	1
Orchitis	—	5	5	—	2
Hydrocele	5	41	46	—	3
Ulcer of penis	—	1	1	—	1
Phimosis	1	12	13	—	—
Para-phimosis	—	14	14	—	—
137. Cyst or other non-malignant tumours of the ovaries	—	1	1	—	—
138. Salpingitis	1	11	12	—	1
139. Uterine tumours (non-malignant) :—					
Fibroid	1	4	5	—	—
140. Uterine haemorrhage (non-puerperal)	—	2	2	—	—
141.A. Metritis	—	5	5	—	1
B. Other affections of the female genital organs :—					
Displacements of the uterus	—	6	6	—	—
Dysmenorrhoea	—	3	3	—	—
Leucorrhoea	—	1	1	—	—
Menorrhagia	—	1	1	—	—
Unclassified	1	4	5	—	—
142. Diseases of the breast (non-puerperal) :—					
Mastitis	—	6	6	—	—
Abscess of the breast	—	12	12	—	1
Carried forward	304	6,800	7,104	186	301

TABLE Vb.—Continued.

Diseases	Remaining at the end of 1936	Admissions during 1937	Total Cases Treated	Deaths	Remaining at the end of 1937
Brought forward	304	6,800	7,104	186	301
VIII. *Puerperal State* :					
143. A. Normal labour ...	—	60	60	—	1
B. Accidents of pregnancy :—					
(*a*) Abortion ...	—	11	11	—	1
(*c*) Other accidents of pregnancy ...	—	4	4	—	—
144. Retained placenta ...	—	8	8	3	—
145. Delayed labour ...	3	36	39	8	1
146. Puerperal septicaemia ...	—	2	2	1	—
147. Phlegmasia dolens ...	—	1	1	—	—
148. Puerperal eclampsia ...	—	1	1	1	—
„ toxaemia ...	—	1	1	—	—
150. Puerperal affections of the breast ..	—	2	2	—	—
IX. *Affections of the Skin and Cellular Tissues* :					
151. Cancrum oris ...	—	7	7	3	—
152. Boil ...	—	15	15	—	—
Carbuncle ...	—	8	8	—	—
153. Abscess—Whitlow ...	7	192	199	2	8
Cellulitis ...	2	113	115	1	11
154. A. Tinea ...	1	4	5	—	1
B. Scabies ...	7	206	213	—	4
155. Other diseases of the skin :—					
Erythema .	—	1	1	—	—
Urticaria ...	—	8	8	—	—
Eczema ...	2	44	46	—	1
Herpes ...	—	5	5	—	—
Psoriasis ...	1	5	6	—	1
Elephantiasis ...	3	13	16	—	—
Myiasis ...	—	2	2	—	—
Chiggers ...	—	37	37	—	—
Dermatitis ...	3	25	28	1	2
Impetigo ...	—	10	10	—	1
Wart ...	—	4	4	—	—
Ulcer ...	56	863	919	4	48
Unclassified ...	—	4	4	—	—
X. *Diseases of Bones and Organs of Locomotion* (*non-Tuberculous*) :					
156. Diseases of the bones :—					
Osteitis ..	—	4	4	—	—
Periostitis ...	1	4	5	—	—
Osteo-myelitis ...	5	18	23	—	3
157. Diseases of the joints :—					
Arthritis ...	6	19	25	—	—
Synovitis ...	1	32	33	—	1
158. Other diseases of bones or organs of locomotion :—					
Bursitis ...	—	4	4	—	—
Ganglion	—	5	5	—	—
Lumbago ...	1	34	35	—	2
Myalgia ...	—	88	88	—	3
Tenosynovitis ...	—	6	6	—	—
Unclassified ...	3	4	7	—	—
XI. *Malformations* :					
159. Malformations :—					
Hydrocephalus ...	—	1	1	—	—
Hypospadias ...	—	1	1	—	1
Other malformations ...	—	4	4	—	—
Carried forward	406	8,716	9,122	210	391

TABLE Vb.—Continued.

Diseases	Remaining at the end of 1936	Admissions during 1937	Total Ccases Treated	Deaths	Remaining at the end of 1937
Brought forward	406	8,716	9,122	210	391
XII. *Diseases of Infancy :*					
160. Congenital debility ...	—	3	3	1	—
XIII. *Affections of Old Age :*					
164. Senility ...	—	8	8	1	—
XIV. *Affections produced by External Causes :*					
175. Food poisoning ...	—	3	3	—	—
176. Attacks of poisonous animals :—					
Snake-bite ...	2	36	38	2	3
Insect-bite ...	1	5	6	—	—
177. Other accidental poisonings ...	—	3	3	—	—
178. Burns (by fire) ...	15	193	208	25	13
179. Burns (other than by fire) ...	—	17	17	2	—
183. Wounds (by firearms, war excepted) ...	—	6	6	—	1
184. Wounds (by cutting or stabbing instruments) ...	10	364	374	2	20
185. Wounds (by fall) ...	5	154	159	1	1
186. Wounds (in mines or quarries) ...	—	1	1	—	—
187. Wounds (by machinery) ...	—	12	12	—	1
188. Wounds (crushing, *e.g.*, rail-accident etc.) ...	1	16	17	1	—
189. Injuries inflicted by animals, (bites, kicks, etc.)	2	107	109	5	10
201.A. Dislocation ...	1	22	23	1	—
B. Sprain ...	1	47	48	—	—
C. Fracture ...	12	143	155	8	19
202. Other external injuries :—					
Concussion ...	1	7	8	—	—
Bruises ...	2	61	63	—	—
Foreign body (except eye) ...	—	11	11	—	2
Abrasions ...	1	36	37	—	—
Unclassified ...	—	24	24	—	1
XV. *Ill-Defined Diseases* :					
205. A. Diseases not already specified or ill-defined :—					
Ascites	4	28	32	2	4
Oedema ...	—	5	5	—	—
Asthenia or debility ...	2	49	51	8	—
Shock ...	—	1	1	—	—
Headache ...	—	8	8	—	—
Pyrexia of uncertain origin ...	—	3	3	1	1
N.Y.D. ...	2	8	10	—	—
B. Malingering ...	—	7	7	—	—
C. Observation cases ...	—	23	23	—	—
TOTAL ...	468	10,127	10,595	270	467

TABLE VI.

Table VIa.—Return of Diseases (European Out-Patients) for the Year 1937.

Diseases	M.	F.
I. *Epidemic, Endemic and Infectious Diseases:*		
1. Enteric group:—		
Type not defined	1	—
5. Malaria:—		
(*a*) Tertian (benign)	12	4
(*b*) Quartan	1	—
(*c*) Aestivo-autumnal (sub-tertian, malignant)	33	10
(*d*) Cachexia (chronic)	1	—
(*e*) Blackwater fever	1	1
(*f*) Undefined	66	34
10. Diphtheria	1	—
11. Influenza	28	10
16. Dysentery:—		
Amoebic	33	23
Undefined or due to other causes	5	1
21. Erysipelas	—	1
25. Other epidemic diseases:—		
Varicella	1	—
31. Tuberculosis, pulmonary and laryngeal	1	2
38. Syphilis:—		
(*a*) Primary	3	—
(*b*) Secondary	3	—
(*e*) Period not indicated	1	1
40A. Gonorrhoea and its complications	11	1
41. Septicaemia:—		
Gas gangrene	1	—
II. *General Diseases not mentioned above:*		
44. Cancer or other malignant tumours of the stomach or liver	—	1
45. Cancer or other malignant tumours of the peritoneum, intestines, rectum	1	—
49. Cancer or other malignant tumours of organs not specified	1	—
50. Tumours (non-malignant):—		
Cyst	5	—
Papilloma	1	1
52. Chronic rheumatism:—		
Rheumatic arthritis	2	3
57. Diabetes (not including insipidus)	4	—
58. Anaemia:—		
Other anaemias	2	12
60. Diseases of the thyroid gland:—		
Exophthalmic goitre	—	1
Other diseases of the thyroid gland	—	1
66. Alcoholism	2	—
69. Other general diseases:—		
Acidosis	—	1
III. *Affections of the Nervous System and Organs of the Senses:*		
74. Apoplexy:—		
Thrombosis	1	—
75. Paralysis:—		
Hemiplegia	2	—
Other paralyses	1	—
77. Other forms of mental alienation:—		
Dementia	2	—
Melancholia	1	—
Carried forward	228	108
Brought forward	228	108
82A. Hysteria	—	1
B. Neuritis	5	—
C. Neurasthenia	13	4
E. Intercostal neuralgia	—	1
F. Migraine	—	2
G. Neuralgia	—	2
H. Sciatica	2	2
85. Diseases of the eye and annexa:—		
Cataract	—	1
Conjunctivitis	6	4
Foreign body	2	—
Stye	—	2
Tumour	—	1
Other diseases	1	4
86. Affections of the ear and mastoid sinus:—		
Mastoiditis	1	—
Otorrhoea	2	2
Otitis	7	3
Other diseases	14	3
IV. *Affections of the Circulatory System:*		
88. Acute endocarditis	—	1
90. Other diseases of the heart:—		
(*a*) Valvular-Mitral	1	—
(*b*) Myocarditis	—	1
(*c*) Disordered action of the heart	2	3
91. Diseases of the arteries:—		
Arterio-sclerosis	2	1
Other diseases	2	—
92. Embolism or thrombosis (non-cerebral)	1	—
93. Diseases of the veins:—		
Haemorrhoids	12	2
Varicose veins and varicocele	1	3
Phlebitis	1	—
94. Diseases of the lymphatic system:—		
Lymphangitis	2	—
Lymphadenitis, bubo (non-specific)	3	—
V. *Affections of the Respiratory System:*		
97. Diseases of the nasal passages:—		
Polypus	1	—
Rhinitis	2	3
Coryza	20	11
Sinusitis	1	—
98. Affections of the larynx:—		
Laryngitis	5	3
99. Bronchitis:—		
Acute	16	13
Chronic	1	—
Bronchiectasis	1	1
100. Broncho-pneumonia	2	—
101. Pneumonia:—		
Lobar	2	—
102. Pleurisy	3	—
Empyema	2	—
105. Asthma	5	—
106. Other affections of the respiratory system:—		
Hay fever	1	2
Carried forward	370	184

TABLE VIa.—Continued

Diseases	M.	F.
Brought forward	370	184
VI. *Diseases of the Digestive System :*		
108 A. Diseases of the buccal cavity and annexa :—		
Alveolar abscess	1	—
Dental caries	9	4
Pyorrhoea	2	—
108 B. Stomatitis	2	1
Gingivitis	—	1
109. Affections of the pharynx or tonsils :—		
Pharyngitis	4	4
Vincent's angina	1	1
Enlargement of tonsil	2	2
Tonsillitis	21	26
Other diseases of the pharynx or tonsils	4	6
111 B. Ulcer of the duodenum	6	1
112. Other affections of the stomach :—		
Gastritis	11	10
Dyspepsia	13	12
Haematemesis	2	—
113. Diarrhoea and enteritis :—		
Under two years	6	2
114. Diarrhoea and enteritis :—		
Two years and over	16	11
Colic	3	1
Colitis	3	3
115. Ankylostomiasis	1	—
116. Diseases due to intestinal parasites :—		
(*a*) Cestoda—Taenia	1	2
(*b*) Nematoda (other than ankylostoma):—		
Ascaris	1	1
Oxyuris	—	2
Strongylus	—	1
117. Appendicitis	16	9
118. Hernia :		
Femoral	—	1
Inguinal	2	—
Umbilical	—	1
119. A. Affections of the anus:—		
Fistula	2	—
B. Other affections of the intestines :—		
Constipation	7	13
123 Biliary calculus	—	1
124. Other affections of the liver :—		
Hepatitis	2	—
Cholecystitis	1	—
Jaundice	1	1
126. Peritonitis (of unknown cause)	—	1
VII. *Diseases of the Genito-urinary System (non-venereal) :*		
129. Chronic nephritis	1	1
130. B. Schistosomiasis.	3	—
131. Other affections of the kidneys :—		
Pyelitis	3	7
Haematuria (non-Bilharzial)	1	—
132. Urinary calculus	1	1
133. Other diseases of the bladder :—		
Cystitis	4	5
Incontinence of urine	—	1
134. Diseases of the urethra—		
Abscess	1	—
135. Diseases of the prostate :—		
Hypertrophy	1	—
Prostatitis	1	—
Carried forward	526	317

Diseases	M.	F.
Brought forward	526	317
136. Diseases (non-venereal) of the genital organs of man :—		
Epididymitis	1	—
Orchitis	2	—
Phimosis	1	—
Para-phimosis	1	—
146. Uterine haemorrhage (non-puerperal)		2
141A. Metritis	—	2
141B. Other affections of the female genital organs :—		
Displacements of the uterus	—	4
Leucorrhoea	—	2
Ovaritis	—	1
Menorrhagia	—	6
Prolapse	—	1
Vaginitis	—	1
Unspecified	—	1
142. Diseases of the breast (non-puerperal) :—		
Mastitis	—	4
VIII. *Puerperal State :*		
143.A. Normal labour	—	12
B. Accidents of pregnancy :—		
Abortion	—	12
Vomiting	—	2
Ante-partum haemorrhage	—	2
Other accidents of pregnancy	—	1
144. Puerperal haemorrhage	—	2
148. Puerperal albuminuria	—	1
IX. *Affections of the Skin and Cellular Tissues :*		
152. Boil	9	6
Carbuncle	4	—
153. Abscess—Whitlow	7	1
Cellulitis	12	2
154. A. Tinea	2	1
155. Other diseases of the skin :—		
Urticaria	3	4
Eczema	1	3
Herpes	6	1
Psoriasis	—	1
Myiasis	2	3
Dermatitis	18	8
Impetigo	3	1
Ulcer	6	2
Unclassified	10	3
X. *Diseases of Bones and Organs of Locomotion (non-Tuberculous) :*		
156. Diseases of the joints :—		
Arthritis	—	1
Synovitis	1	1
158 Other diseases of bones or organs of locomotion :—		
Bursitis	—	1
Ganglion	1	2
Lumbago	9	4
Myalgia	18	5
Tenosynovitis	3	1
XII. *Diseases of Infancy :*		
160. Congenital debility	1	—
Carried forward	647	424

TABLE VIa.—Continued.

Diseases	M.	F.
Brought forward	647	424
XIII. *Affections of Old Age :*		
164. Senility	1	2
XIV. *Affections produced by External Causes :*		
165. Suicide (attempted) by poisoning	2	—
170. Suicide by firearms	1	—
175. Food poisoning	—	1
176. Attacks of poisonous animals :—		
Insect-bite	3	5
178. Burns (by fire)	—	2
179. Burns (other than by fire) ...	1	2
184. Wounds (by cutting or stabbing instruments)	2	3
185. Wounds (by fall)	14	—
187. Wounds (by machinery) ...	1	—
189. Injuries inflicted by animals, (bites, kicks, etc.) ...	6	2
Carried forward	678	441
Brought forward	678	441
194. Exposure to heat :—		
Sun stroke	1	—
201. A. Dislocation	1	—
B. Sprain	17	3
C. Fracture	5	3
202. Other external injuries :—		
Bruises	10	1
Foreign body (except eye) ...	1	—
Abrasions	4	—
Unclassified ...	3	—
XV. *Ill-Defined diseases :*		
205 A. Diseases not already specified or ill-defined :—		
Asthenia or debility ...	21	18
Headache	1	2
Pyrexia of uncertain origin ...	—	3
N.Y.D.	1	1
Total ...	743	472

TABLE VI.

Table VIb. Return of Diseases (Native Out-Patients) for the Year 1937. (Including Asiatics, Native Officials, K.A.R. Native Ranks, Native General Population, Asiatic and Native Convicts).

Diseases.	Hospital Out-Patients		Rural Dispensaries	
..	Males	Females	Males	Females
I. *Epidemic, Endemic and Infectious Diseases :*				
1. Enteric group :—				
Type not defined	—	1	—	—
3. Relapsing fever	107	32	—	—
5. Malaria—				
(*a*) Tertian (benign)	194	87	—	—
(*b*) Quartan	85	60	—	—
(*c*) Aestivo-autumnal (sub-tertian, malignant)	804	440	—	—
(*d*) Cachexia (chronic) ...	57	39	—	—
(*f*) Undefined	2,592	1,524	5,870	3,859
6. Smallpox	5	—	45	40
Alastrim	1	2	—	—
7. Measles	49	36	175	168
9. Whooping cough (pertussis) ...	445	475	1,411	1,118
11. Influenza	889	394	1,740	1,543
13. Mumps	10	3	131	112
16. Dysentery :—				
(*a*) Amoebic	118	32	—	—
(*b*) Bacillary	5	5	—	—
(*c*) Undefined or due to other causes ...	88	44	718	466
20. Leprosy	81	35	43	22
21. Erysipelas	3	2	—	—
22. Acute poliomyelitis	1	—	—	—
23. Encephalitis lethargica (sleepy sickness)	2	2	—	—
24. Epidemic cerebro-spinal fever ...	16	15	—	—
25. Other epidemic diseases :—				
(*a*) Rubeola ...	3	1	—	—
(*b*) Varicella	57	34	58	81
Rat bite fever	1	—	—	—
(*f*) Epidemic dropsy ...	2	—	—	—
(*g*) Yaws	545	486	995	934
(*h*) Trypanosomiasis	2	—	—	—
29. Tetanus ...	2	—	—	—
30. Mycosis	6	—	—	—
31. Tuberculosis, pulmonary and laryngeal ...	104	40	1	—
32. Tuberculosis of the meninges or central nervous system ...	1	—	—	—
33. Tuberculosis of the intestines or peritoneum	9	3	—	—
34. Tuberculosis of the vertebral column ...	14	1	—	—
35. Tuberculosis of bones and joints ...	24	4	—	—
36. Tuberculosis of other organs :—				
(*a*) Skin or subcutaneous tissue (Lupus)	1	3	—	—
(*b*) Lymphatic system	26	16	—	—
(*d*) Other organs	1	—	—	—
38. Syphilis :—				
(*a*) Primary	301	167	—	—
(*b*) Secondary	407	416	—	—
(*c*) Tertiary	195	174	—	—
(*d*) Hereditary	57	56	—	—
(*e*) Period not indicated ...	174	153	135	134
39. Soft chancre	3	6	—	—
40. A. Gonorrhoea and its complications ...	522	199	150	54
B. Gonorrhoeal ophthalmia ...	1	2	—	—
C. ,, arthritis ...	5	2	—	—
41. Septicaemia:—				
Blood poisoning	1	1	—	—
42. Other infectious diseases—Filariasis ...	2	—	—	—
II. *General Diseases not mentioned above :*				
43. Cancer or other malignant tumours of the buccal cavity	2	1	—	—
Carried forward	8,020	4,993	11,472	8,531

TABLE VIb.—Continued.

Diseases.	Hospital Out-Patients		Rural Dispensaries.	
	Males	Females	Males	Females
Brought forward	8,020	4,993	11,472	8,531
44. Cancer or other malignant tumours of the stomach or liver	5	1	—	—
45. Cancer or other malignant tumours of the peritoneum, intestines, rectum ...	1	—	—	—
47. Cancer or other malignant tumours of the breast	—	2	—	—
48. Cancer or other malignant tumours of the skin	4	3	—	—
49. Cancer or other malignant tumours of organs not specified	13	8	—	—
50. Tumours (non-malignant) :—				
Adenoma	17	14	—	—
Lipoma	19	9	—	—
Cyst	43	21	—	—
Dermoid cyst	8	1	—	—
Fibroma	8	4	—	—
Osteoma	4	1	—	—
Papilloma	5	2	—	—
Polypus	2	2	—	—
Unspecified	9	7	31	21
51. Acute rheumatism (Rheumatic fever) ...	4	1	—	—
Sub-acute rheumatism ...	43	23	—	—
52. Chronic rheumatism :—				
Rheumatic arthritis	858	507	2,699	1,724
53. Scurvy	1	2	—	—
54. Pellagra	31	7	7	3
55. Beri-beri	7	—	—	—
56. Rickets	7	1	—	—
57. Diabetes (not including insipidus) ...	—	1	—	—
58. Anaemia :—				
Other anaemias	31	14	194	204
60. Diseases of the thyroid gland :—				
(*a*) Exophthalmic goitre ...	3	12	—	—
(*b*) Other diseases of the thyroid gland	1	17	—	—
61. Diseases of the para-thyroid glands :—				
Tetany	—	1	—	—
64 Diseases of the spleen :—				
Abscess	—	1	—	—
Splenitis	3	1	—	—
Other diseases of the spleen ...	4	1	—	—
65. Leukaemia :—				
Hodgkin's disease	1	—	—	—
67. Chronic poisoning by mineral substances	1	—	—	—
III. *Affections of the Nervous System and Organs of the Senses* :				
71. Meningitis (not including tuberculous meningitis or cerebro-spinal meningitis)	5	2	—	—
72. Locomotor ataxia ...	1	—	—	—
73. Other diseases of the spinal cord :—				
Myelitis	1	1	—	—
Spastic paraplegia	2	—	—	—
75. Paralysis :—				
(*a*) Hemiplegias	15	2	1	—
(*b*) Other paralyses	16	10	—	—
77. Other forms of mental alienation :—				
Dementia	1	—	—	—
Melancholia	1	—	—	—
Idiocy	9	—	—	—
Delusional insanity	2	4	—	—
Other mental diseases ...	3	2	—	—
78. Epilepsy	64	17	26	13
80. Infantile convulsions	1	1	—	—
81. Chorea	3	—	—	—
Carried forward	9,277	5,696	14,430	10,496

TABLE VIb.—Continued.

Diseases.	Hospital Out-Patients Males	Hospital Out-Patients Females	Rural Dispensaries Males	Rural Dispensaries Females
Brought forward ...	9,277	5,696	14,430	10,496
82. A. Hysteria	2	3	—	—
B. Neuritis	15	5	—	—
C. Neurasthenia	1	—	—	—
D. Hemicrania	4	—	—	—
E. Intercostal neuralgia ...	9	2	—	—
F. Migraine	2	3	—	—
G. Neuralgia	155	58	—	—
H. Sciatica	23	7	—	—
84. Other affections of the nervous system :—				
Paralysis agitans	3	1	—	—
Brain tumour	1	1	—	—
Unspecified	—	—	95	104
85. Diseases of the eye and annexa :—				
Blepharitis	20	32	—	—
Cataract	28	6	—	—
Chalazion	2	2	—	—
Conjunctivitis	3,061	2,923	9,672	10,145
Foreign body	50	19	—	—
Glaucoma	5	1	—	—
Optic neuritis	10	1	—	—
Stye	24	16	—	—
Ulcer of cornea	102	58	—	—
Trachoma	2	—	—	—
Other diseases	140	41	—	—
86. Affections of the ear and mastoid sinus :—				
Mastoiditis	33	17	—	—
Otorrhoea	566	381	4,541	3,345
Otitis	692	368		
Inflammation of tympanum ...	4	1	—	—
Cerumen	157	53	—	—
Other diseases	145	64	—	—
IV. *Affections of the Circulatory System :*				
87. Pericarditis	1	—	—	—
88 Acute endocarditis	2	—	—	—
89. Angina pectoris	2	2	—	—
90. Other diseases of the heart :—				
(*a*) Valvular—Mitral ...	10	5	—	—
Aortic ...	7	3	—	—
(*b*) Myocarditis	10	3	—	—
(*c*) Disordered action of the heart :—				
Bradycardia	6	4	32	17
Tachycardia	15	6		
91. Diseases of the arteries :—				
(*a*) Aneurysm	1	1	—	—
92. Embolism or thrombosis (non-cerebral)	1	—	—	—
93 Diseases of the veins :—				
Haemorrhoids	30	4	12	4
Varicose veins and varicocele ...	21	2	—	—
Phlebitis	6	1	—	—
94. Diseases of the lymphatic system :—				
Lymphangitis ...	35	16	8	5
Lymphadenitis, bubo (non-specific) ...	45	14	—	—
95 Haemorrhage of undetermined cause :—				
Epistaxis	5	1	—	—
V. *Affections of the Respiratory System :*				
97. Diseases of the nasal passages :—				
Adenoids	1	—	—	—
Polypus	4	2	—	—
Rhinitis ...	3	1	—	—
Coryza	2,926	1,361	9,323	5,700
Sinusitis	9	5	—	—
Carried forward	17,673	11,190	38,113	29,816

TABLE VIb.—Continued.

Diseases.	Hospital Out-Patients Males	Hospital Out-Patients Females	Rural Dispensaries. Males	Rural Dispensaries. Females
Brought forward	17,673	11,190	38,113	29,816
98. Affections of the larynx :—				
Laryngitis	18	9	—	—
99. Bronchitis :—				
(*a*) Acute	5,599	2,437	20,071	11,265
(*b*) Chronic	2,628	1,781		
Bronchiectasis	1	—	—	—
100. Broncho-pneumonia	63	49	—	—
101. Pneumonia—(*a*) Lobar ...	84	32	—	—
(*b*) Unclassified ..	8	2	318	291
102. Pleurisy :—				
(*a*) Empyema	15	4	—	—
(*b*) Other pleurisies	54	18	49	34
103. Congestion of the lungs ...	2	—	—	—
105. Asthma	156	39	377	228
107. Other affections of the respiratory system :—				
Pleurodynia	17	8	—	—
Haemoptysis	1	—	—	—
VI. *Diseases of the Digestive System* :				
108. A. Diseases of the buccal cavity and annexa :—				
Alveolar abscess	37	19	—	—
Dental caries	1,852	1,270	3,214	2,232
Pyorrhoea	319	203		
Gingivitis	3	—	—	—
B. Stomatitis	278	195	191	564
Glossitis	10	5	—	—
Ludwig's angina	1	1	—	—
109. Affections of the pharynx or tonsils :—				
Pharyngitis	319	87	1,538	805
Tonsillitis	355	128		
Vincent's angina	3	4	—	—
Enlargement of tonsil ...	5	—	—	—
Other diseases of the pharynx or tonsils	4	—	—	—
111. A. Ulcer of the stomach ...	2	—	—	—
112. Other affections of the stomach :—				—
Gastritis ...	54	35	3,740	2,071
Dyspepsia	718	321		
Haematemesis	1	1	—	—
113. Diarrhoea and enteritis :—				
Under two years	398	272	2,795	1,989
114. Diarrhoea and enteritis :—				
Two years and over ...	615	260	2,911	2,030
Colic	180	76	—	—
Colitis	65	25	—	—
115. Ankylostomiasis	5,302	2,618	2,401	1,920
116. Diseases due to intestinal parasites :—				
Cestoda—Taenia ...	21	8	91	38
Nematoda (other than ankylostoma) :—				
Ascaris	480	365	921	463
Strongylus	63	17	—	—
Oxyuris	15	11	—	—
Unclassified	9	3	100	121
117. Appendicitis	9	14	—	—
118 Hernia :—				
(*a*) Femoral	3	—	—	1
(*b*) Inguinal	55	—	9	—
(*c*) Umbilical	10	8	—	—
(*d*) Unclassified	4	—	—	—
119. A. Affections of the anus :—				
Fistula	5	—	—	—
Fissure of anus	1	—	—	—
Prolapse of rectum	7	3	—	—
Carried forward	37,522	21,518	76,839	53,868

TABLE VIb.—Continued.

Diseases.	Hospital Out-Patients		Rural Dispensaries	
	Males	Females	Males	Females
Brought forward	37,522	21,518	76,839	53,868
B. Other affections of the intestines :—(included under 119)				
Constipation	6,480	3,202	18,197	9,831
Other affections	1	—	88	52
122. Cirrhosis of the liver :—				
Alcoholic	5	—	—	—
Other forms	5	—	—	—
124. Other affections of the liver :—				
Abscess	3	—	—	—
Hepatitis ...	10	1	—	—
Cholecystitis	2	2	—	—
Jaundice	22	9	15	13
126. Peritonitis (of unknown cause) ...	3	—	—	—
VII. *Diseases of the Genito-urinary System (non-venereal)* :				
128. Acute nephritis	1	8	—	—
129. Chronic nephritis	3	4	—	—
130. B. Schistosomiasis	3,779	1,420	1,644	641
131. Other affections of the kidneys :—	13	47	—	—
Haematuria (non-Bilharzial) ...	60	—	—	—
132. Urinary calculus	1	—	—	—
Renal calculus	2	—	—	—
133. Diseases of the bladder :—				
Cystitis	29	7	—	—
Incontinence of urine	—	1	—	—
Retention of urine	5	1	—	—
134. Diseases of the urethra :—				
Stricture	3	—	—	—
Abscess	1	—	—	—
Vesico-vaginal fistula	—	4	—	—
Other diseases	9	—	—	—
135. Diseases of the prostate—				
Prostatitis	2	—	—	—
136. Diseases (non-venereal) of the genital organs of man :—				
Epididymitis	17	—	—	—
Orchitis	26	—	103	—
Hydrocele	52	—	—	—
Ulcer of penis	7	—	10	—
Phimosis	16	—	—	—
Para-phimosis	14	—	—	—
137. Cyst or other non-malignant tumours of the ovaries	—	2	—	—
138. Salpingitis	—	14	—	—
139. Uterine tumours (non-malignant) :—				
Fibroid	—	7	—	—
140. Uterine haemorrhage (non-puerperal) ...	—	2	—	—
141. A. Metritis	—	7	—	—
B. Other affections of the female genital organs :—				—
Displacements of the uterus ...	—	7	—	—
Amenorrhoea	—	4	—	—
Dysmenorrhoea	—	13	—	—
Leucorrhoea	—	1	—	—
Ovaritis	—	1	—	—
Menorrhagia ...	—	4	—	—
Unclassified	—	8	—	—
142. Diseases of the breast (non-puerperal) :—				
Mastitis	—	27 }	—	279
Abscess of breast	—	69 }		
Other diseases of the breast ...	—	3	—	—
Carried forward	48,093	26,393	96,896	64,684

TABLE VIb. Continued.

Diseases.	Hospital Out-Patients Males	Hospital Out-Patients Females	Rural Dispensaries Males	Rural Dispensaries Females
Brought forward	48,093	26,393	96,896	64,684
VIII. *Puerperal State:*				
143. A. Normal labour	—	64	—	—
B. Accidents of pregnancy :—				
(*a*) Abortion	—	12	—	—
(*e*) Other accidents of pregnancy ...	—	10	—	—
144. Retained placenta	—	12	—	—
145. Delayed labour	—	53	—	—
146. Puerperal septicaemia	—	3	—	—
147. Phlegmasia dolens ...	—	1	—	—
148. Puerperal eclampsia	—	1	—	—
„ toxaemia	—	1	—	—
150. Puerperal affections of the breast ...	—	2	—	—
IX. *Affections of the Skin and Cellular Tissues:*				
151. Cancrum oris	5	3	—	—
152. Boil	450	174	1,582	1,029
Carbuncle	16	9	—	—
153. Abscess—Whitlow	694	381	1,988	1,419
Cellulitis	315	103	76	38
154. A. Tinea	361	135	533	314
B. Scabies	4,224	2,561	10,213	7,708
155. Other diseases of the skin :—				
Erythema	17	22	—	—
Urticaria	82	32	—	—
Eczema	1,001	762	—	—
Herpes	50	21	—	—
Psoriasis	41	36	—	—
Prickly heat	4	4	—	—
Elephantiasis	17	4	—	—
Myiasis	6	5	—	—
Chiggers	222	126	—	—
Dermatitis	196	96	—	—
Acne	19	1	—	—
Impetigo	275	248	—	—
Seborrhoea	5	5	—	—
Wart	23	8	—	—
Ulcer	8,305	3,541	25,315	13,816
Unspecified ...	14	7	4,396	3,599
X. *Diseases of Bones and Organs of Locomotion (non-Tuberculous):*				
156. Diseases of the bones :—				
Osteitis	10	5	—	—
Periostitis	9	3	—	—
Osteo-myelitis	20	5	—	—
157. Diseases of the joints :—				
Arthritis	21	4	—	—
Synovitis	183	49	127	88
158. Other diseases of bones or organs of locomotion :—				
Bursitis	7	2	—	—
Ganglion	31	16	—	—
Lumbago	539	170 }	3,866	2,351
Myalgia	2,001	863 }		
Tenosynovitis	40	21	—	—
Unclassified	14	—	—	—
Carried forward	67,310	35,974	144,992	95,046

Diseases.	Hospital Out-Patients Males	Hospital Out-Patients Females	Rural Dispensaries Males	Rural Dispensaries Females
Brought forward ...	67,310	35,974	144,992	95,046
XI *Malformations:*				
159. Malformations:—				
Hydrocephalus	1	2	—	—
Hypospadias	1	—	—	—
Other malformations	5	2	—	—
XII. *Diseases of Infancy:*				
160. Congenital debility	4	4	—	—
XIII. *Affections of Old Age:*				
164. Senility	111	10	—	—
XIV. *Affections produced by External Causes:*				
174. Food poisoning	10	4	—	
176. Attacks of poisonous animals:—				
Snake-bite	63	20	149	67
Insect-bite	58	16	274	170
177. Other accidental poisonings ...	3	—	—	—
178. Burns (by fire)	715	481	3,117	2,619
179. Burns (other than by fire) ...	66	54		
183. Wounds by firearms (war excepted) ...	9	1	—	—
184. Wounds (by cutting or stabbing instruments)	5,767	1,073	18,934	6,452
185. Wounds (by fall)	2,742	643	10,383	3,301
186. Wounds (in mines or quarries) ...	1	—	—	—
187. Wounds (by machinery) ...	17	—	—	—
188. Wounds (crushing e.g., rail accident, etc.)	22	1	—	—
189. Injuries inflicted by animals (bites, kicks, etc.)	305	78	220	92
195. Lightning stroke	—	1	—	—
201. A. Dislocation	36	9	—	—
B. Sprain	421	105	1,115	321
C. Fracture	140	37	46	24
202. Other external injuries:—				
Concussion	7	—	—	—
Bruises	726	177	—	—
Foreign body (except eye) ...	153	44	—	—
Abrasions	1,263	261	—	—
Unclassified	1,470	565	3,778	1,465
XV. *Ill-Defined Diseases:*				
205. A. Diseases not already specified or ill-defined:—				
Ascites	31	3	—	—
Oedema	14	3	—	—
Asthenia or debility ...	109	50	—	—
Shock	2	—	—	—
Headache	2,198	801	6,709	3,044
Pyrexia of uncertain origin ...	3	—	—	—
N. Y. D.	14	16	—	—
B. Malingering	8	1	—	—
C. Observation cases	18	5	—	—
TOTAL ...	83,823	40,441	189,717	112,601

POST-OPERATIVE COMPLICATIONS IN THE NATIVES OF NYASALAND.

BY

C. H. HOWAT, F.R.C.S., Edin., D.T.M. and H.

After four years surgical practice in Nyasaland I have come to the conclusion that the complications met with after operation in more temperate climates are encountered very rarely or not at all in this Protectorate.

Before discussing the reasons which lead one to make this statement it is necessary to point out that lesions such as pulmonary embolus, atelectasis, post-operative gangrene of the skin and acute dilatation of the stomach are not common *sequelae* of operation even in hospitals at home and that therefore the fact that they do not occur in this country, where surgical cases are comparatively few, is not remarkable.

A group of conditions including paralytic ileus and its precursor, gaseous distension, also requires mention. Although they can occur without the abdomen having been opened these complications usually follow either an infective process within the peritoneal cavity or torsion or prolonged handling of intra-abdominal viscera and since the diseases in which these factors appear are but rarely met with in the African native, the post-operative lesions for which they are responsible need not be considered.

There remains what may be called the common complications of operation, namely:

Post-anaesthetic vomiting.
Infection of the surgical wound.
Retention of urine.
Pulmonary lesions: bronchitis, pneumonia, etc.

It is with regard to these conditions that the following observations are offered.

(1) *Post-anaesthetic Vomiting.*

In suitable cases chloroform and ether still remain favourite anaesthetics. In English hospitals the occurrence of vomiting after their use has been greatly reduced by the adoption of a less spartan pre-operative preparation, but despite this, post-anaesthetic vomiting still forms a troublesome feature of operations in which these drugs have been used.

In the Zomba African Hospital during 1937 chloroform and/or ether was used in 233 cases. Despite the fact that several operations were lengthy procedures, such as the transplantation and fixation of pedicle grafts, only three patients vomited during recovery from the effects of anaesthesia and in each instance the discomfort thus occasioned was slight.

The fact that post-anaesthetic sickness occurs so infrequently may possibly be explained by the work of Wallace and Marshall (1), who report upon the efficiency of Shipway's apparatus, which administers a warmed mixture of air and chloroform (or ether) for the purpose of anaesthesia. A feature of this method they say, is not only the rapid return to full consciousness, but the rarity of vomiting. It seems probable that the reason for the absence of after effects when using Shipway's apparatus is that the use of warmed air renders an undue concentration of anaesthetic under the mask impossible and therefore the saliva is not saturated with the particular drug in use.

The temperature in an African operating theatre is such as to provide conditions for inhalation anaesthesia which must closely resemble those produced artificially by Shipway's apparatus and since it is believed that post-anaesthetic vomiting results from the irritation of gastric mucosa by the ether or chloroform saturated saliva, the absence of such saturation explains the absence of vomiting.

(2) *Infection of the Wound and Stitch Abscess.*

During the past year 495 operations were performed in the African Hospital. Examination of the records of these cases shows that in almost every clean surgical case the wound healed by first intention. This fact is as true for Europeans as for Africans.

The occurrence of stitch abscess as with other forms of wound infection was always traceable to some avoidable mistake or oversight on the part of the surgeon or his staff. Failure to secure haemostasis, ineffective apposition of skin edges, and inadequate drainage are some of the factors which result in wound sepsis at home and these and other errors of a similar nature are responsible for this complication in the tropics.

The statement, which is so frequently made and which causes so much uneasiness to European patients, that a surgical wound heals badly in hot climates, is not correct.

(3) *Retention of Urine.*

In a series of operations performed for general surgical conditions at the Royal Infirmary of Edinburgh, this complication occurred in 9% of males and 7% of females. Had the investigation been confined to operations in the hypogastric and perineal regions the percentage of patients developing retention of urine would probably have been higher.

The writer has now operated upon a total of 122 cases in which this complication might reasonably have been expected to occur; that is, in cases of inguinal hernia, hydrocele, haemorrhoids, elephantiasis of the genitalia and the like. Retention of urine has never been met with.

A simple, if somewhat unscientific explanation of this remarkable fact is as follows ;—

In the European patient retention of urine as a complication of operation is an ever present possibility in the minds of the surgeon and nursing staff. There is always some anxiety until the patient has emptied his bladder. There is perhaps, constant enquiry as to whether or not he has done so and the patient's attention is directed towards his urinary organs. He feels that the interest shown in his excretory function perhaps may indicate a fear on the part of his attendants that difficulty may be experienced with micturition. He may therefore get retention, particularly if his modesty is outraged by the solicitude of a female nursing staff to which he is not yet accustomed. In addition, the European fears the post operative period. He has been told or he imagines from his lay knowledge of surgery that the after pain, the sleeplessness, the dressings and the removal of stitches will prove an unpleasant experience. His mind is ready to accept the possibility of further discomfort.

The native patient on the other hand has little or no knowledge of the post-operative phase partly because the practice of surgery is in its infancy in Nyasaland and partly because of a natural tendency in the African to minimize painful experiences when speaking to others, because pain, to the African, is not a fear which has to be overcome.

When full confidence has been given to the surgeon, the first thought that enters the native mind as he recovers from his anaesthetic is that his disease has now gone and this fills his mind to the exclusion of everything else. In the more sceptical the first thought is a profound thankfullness to find himself still alive, which gratifying discovery likewise claims all his attention. The native is therefore not in the same receptive state of mind as the European towards enquiries as to his welfare and these enquiries are made as a rule only by the medical officer.

Apart from the difference in mental attitude towards the post-operative period which the European and African undoubtedly exhibit, there remains what is perhaps the most important factor of all in explaining the absence of retention of urine in native patients, namely, that the African will not remain in bed unless he is too ill to leave it. If he can be persuaded to stay in bed he will not lie still, but constantly changes his position. Such movement must play a large part in securing a normal action of the bladder.

(4) *Pulmonary Lesions.*

It is recognised that bronchitis, broncho-pneumonia and even pneumonia may constitute *sequelae* to operation particularly in elderly subjects or in those who already have some chest complaint. The Nyasaland native is peculiarly prone to pulmonary disease and it is therefore worthy of note that none of these diseases has as yet been encountered as post-operative complications.

It is of course stated that these conditions usually complicate abdominal surgery and since this type of work is relatively infrequent in this country the absence of pulmonary complications would seem to be explained. Recent investigations, (2) have shown however that bronchitis or broncho-pneumonia may follow such diverse procedures as manipulation of fractures and tooth extraction, whilst thyroidectomy which in its various forms is quite often undertaken in Nyasaland, is listed as being the operation, next to laparotomy, most commonly followed by pulmonary complications. Furthermore, accordingly to modern statistics (3) the anaesthetic *per se* has little to do with the development of chest complaints, viz.,

Ether	used	in	2,069	cases,	256	developed	bronchitis	(12.4%)
Spinal	,,	,,	425	,,	71	,,	,,	(16.7%)
Local	,,	,,	152	,,	28	,,	,,	(18.4%)

Revenstine and Taylor (4) lay great stress upon the time occupied by operation; the anaesthetic playing a minor part if it is a factor at all, viz.,

Operation lasting 1½ hours. Chest complaints are twice as numerous as when the operation takes 1 hour or less.

Operation lasting 2 hours. Chest complaints are three times as numerous as in the 1 hour operation.

Comparing these points with the results of an examination of our own cases it appears that the absence of pulmonary complications in Nyasaland natives is real and not apparent, for not only do we perform the operations known to be followed by these conditions but many of the operations are time-consuming, such as the removal of elephantoid tissue and the cure of large irreducible herniae.

In seeking for the reasons as to why this should be so one believes that an important part lies in the fact that the patient is not exposed to the extremes of temperature during his journeys between ward and operating theatre, that he is at home. In Africa the temperature is the same in the wards as it is in the corridors and theatre.

Another factor is that the native surgical case can rarely be kept absolutely at rest. He is constantly moving about and gets out of bed at the first opportunity. Being less amenable to hospital discipline and indeed, unlike Europeans, not expecting or intending to stay in bed after operation, his respiratory movements are not lessened in any way, as for instance are those of the European, who remains for days immobile in the Fowler position with the pain from an abdominal wound impeding the descent of the diaphragm and therefore ventilation of the lungs.

There remains one observation (5) which seems of considerable moment in explaining the absence of pulmonary and indeed many other complications amongst these natives. It is to the effect that not only is the mortality rate after operation less in thin than in fat patients but the occurrence of post-operative lesions is also less frequent. For example :—

Suppuration of surgical wound.

35 per cent in fat patients ; 10 per cent in thin.

Bronchitis.

32 per cent in fat patients ; 3 per cent in thin.

Pneumonia.

6 per cent in fat patients ; 1 per cent in thin.

Adiposity is not commonly seen in Nyasaland natives.

(1) Wallace and Marshall. *Lancet*. Jan. 1916. **70** ; Jan. 1917. **640.**

(2) Brock. Guy's Hospital Reports. April, 1935. **191.**

(3) King. J. Amer. med. Ass. 1933. **c. 21.**

(4) Revenstine and Taylor. Amer. J. med. Sci. 1936. **cxcl. 807.**

(5) Seigert. Munch. Med. Woch. Dec., 1934. **1917.**

Appendix II.

CEREBRO-SPINAL FEVER IN NYASALAND IN 1937

BY

DR. W. T. C. BERRY, Medical Officer.

Meningococcal meningitis has for many years been endemic in Nyasaland. During 1937, reports of small unimportant foci were received from several districts throughout the Protectorate. Though slightly in excess of the average for previous years, these foci, with a single exception, followed a course more or less typical of endemic meningitis in Nyasaland, i.e. isolated cases would appear in villages, and the disease would smoulder gently until extinguished either by the efforts of the local medical officer or through natural causes.

In Mlanje district the disease assumed epidemic form. The first case arose in August 1937. By September, the area to the west and north west of Mlanje mountain, inhabited by some 90,000 people, was fairly uniformly infected.

Owing to the secretive nature of the Anguru it was impossible to ascertain the starting point or point of entry of the epidemic. It is, however, significant that severe infection occurred early in the epidemic at an inaccessible but densely populated area on the Portuguese East African border.

In spite of preventive measures taken in Mlanje the disease spread into Chiradzulu, and in October was steadily advancing towards the densely populated areas around Limbe and Blantyre Townships.

In October, there were therefore seconded an Administrative Officer, a Medical Officer and a Sub Assistant Surgeon, to special duty in connection with the epidemic; fifty native police were also allotted to this work.

The plan arrived at after consultation with the Director of Medical Services was to establish a "clean belt" which should serve as a bar to the progress of the disease. In this belt the native was to be prepared, by propaganda, for the onset of the disease, made aware of its infectious nature, and instructed in methods of isolation and quarantine. At the same time, by thorough policing of these areas, laws would be enforced with a view to stopping the progress of the disease. The measures adopted will be elaborated below.

The clean belt was therefore established; it was roughly 100 miles long, and varying in thickness from 20 to 40 miles, it described an arc, boxing in the areas of Mlanje and south Chiradzulu, involving Zomba, Blantyre, northern Chiradzulu, and Cholo districts. During the establishment of this belt it was found to contain already a few unimportant foci of the disease. Later the growing edge of the epidemic touched this clean belt at points over its whole length; at no point did it break through it.

District Commissioners and Medical Officers in each district carried out the measures required. The special officers seconded correlated efforts in all districts and performed any special tasks which might be required in any district. The clean belt, once established, was left to the care of the district officers concerned, whilst attention was devoted to the infected areas.

The ensuing paragraphs deal with the peculiar difficulties which had to be dealt with, and indicate the nature of the work. Native customs are dealt with at special length because they have an important bearing on the spread of disease.

NATIVE CUSTOMS AND HABITS IN RELATION TO MENINGITIS.

Natives spend their leisure hours in much the same way as Europeans, in social contacts, gossip, dancing, drinking, and visiting of sick friends. They attach, however, rather more importance to this side of life than do Europeans, and from late August to early November the men at any rate have more time to devote to this than Europeans have. In Mlanje and Chiradzulu beerdrinks are not held in the open; the beer hut is usually overcrowded; ventilation is minimal; the beerdrink lasts up to 48 hours, the participants then returning to their various villages.

With regard to illness, it is not so very long since death in the Bantu was attributed to one cause only, witchcraft. The Nyasaland native now recognises thoroughly the existence of disease, but the idea persists that the disease may by ill-will or witchcraft be put upon the subject by an outside person. In order to clear himself of the stigma of such witchcraft, it is necessary for a man, on hearing of the serious illness of a relation, to present himself at the sick man's bedside and to protest his affection and his hopes of the patient's recovery. In the case of near relations, natives may travel considerable distances on this errand. I observed one man who had travelled some 60 miles to his sick mother. There is no doubt that affection also plays a considerable part in such cases, and the gifts of food which are frequently brought must benefit greatly a patient who is too ill to fend for his or herself. Its application, however, to relations distant both in the sense of consanguinity and space, and the fact that these visitors may rest at the affected village for some days before returning home, renders it a formidable factor in the spread of infectious disease.

In the event of the sick person's death, relations are obliged, for the same reasons of the stigma of witchcraft, to attend the funeral. The obligation is reciprocal. The family must send invitations to all relations in order to avoid any question of a guilty "hushing up" of the subject's death; the relations are bound to accept the invitation.

The funeral ceremonies are two fold. The corpse is interred, the elder relations of the deceased, only, taking part in the proceedings. Since speedy burial is desirable in the tropics, those relations who live far away do not attend, merely being informed of the death. Those from the nearer villages usually remain for two days or so, in order to ascertain that the food left on the man's grave has met with the approval of his spirit. At a later date a ceremonial feast and beer drink are held. Generally about a month is allowed to pass, and the ceremony is in final recognition of the dead man's departure. At this occasion even relations from distant parts attend, and the funeral beerdrink may last a considerable time.

It seemed to me unlikely that the native should not during the serious smallpox epidemics before and shortly after war, have realized the dangers of these two customs. Enquiry of the older men elicited the following:—

In the case of sickness from smallpox, the ceremony of visiting the sick was waived. If relations came at all they stood at a distance and shouted their sympathy in safety. In the case of death from smallpox the body was quickly interred; only the relations in the village took part in this. The funeral ceremonies and beerdrink were postponed until the epidemic had left the country.

Isolation of smallpox cases in grass huts outside the villages was and is customary. Chickenpox, from which smallpox is not always easy to differentiate, is sometimes similarly isolated. I was told that this custom is also applied to infectious diseases such as measles, but my own observations in Mlanje did not confirm this.

Isolation of contacts of smallpox had never been practiced. In the event, however, of smallpox appearing in a village the men refrained from intercourse with their wives until the danger was over. In the event of a stranger entering an infected village he was on his return home afflicted with a similar prohibition until such time as he was deemed safe. As a rule there was no prohibition upon sleeping in the same room or house, only intercourse was barred. In a few instances I was told, however, that the man was made either to sleep on the "*Khonde*" or in a separate house.

This appeared to me to be the rudiment of the idea of quarantine, and I always referred to it in dealing with meningitis.

The customs with which I have dealt apply to the Anguru in Nyasaland. These customs exist with certain modifications in most of the Nyasaland tribes. They provide a mechanism for the spread of disease which is not present in European epidemics. If this mechanism is overlooked then other preventive measures are rendered valueless. The native has ready to hand his own system of prevention of epidemic disease. Once he has appreciated the infectious nature of a disease he will apply this preventive system of his own accord, and can be persuaded to modify it in order to meet the special requirements of any particular disease.

In compiling these notes I wish to thank Mr. E. D. Bowman, M.B.E., Principal, Jeanes Training Centre for his valuable criticism and assistance in many of the points concerned.

MAIN METHODS OF SPREAD OF MENINGITIS.

In descending order I rank the following:—

(1) Funeral ceremonies.

(2) Ceremonial visiting of the sick.

(3) The restoration of dying people to their homes.

In the event of a man, living with his wife in her village, falling dangerously ill, sometimes, in order to avoid the stigma of having caused his death, the people of the wife's village restore him to his own home before he dies. Males suffering from meningitis were transported from one village to another. A new focus was thus set up, either through the sick man himself or through his wife's "carrier" relatives who attended the subsequent funeral.

(4) Beerdrinks.

Late October and early November, the peak of the beerdrinking season, was also the peak of the epidemic. Towards the end of November and during December "hoeing beer" is brewed, actually this is probably not a dangerous factor in the spread of meningitis. A period of want often follows at the beginning of the year and there is little beerdrinking. If, however, there are prospects of a plentiful and early harvest, reserves of maize may be utilised for brewing in February or March.

(5) Certain Trades.

As an example, boys buy fish at the beaches of Chilwa L
territory. They then travel on bicycles to sell in Mlanje, Cho
way. Fish boys were found sick who at the onset of the
wayside villages; they stayed there until their death or reco

(6) The custom of visiting relations occasionally and

(7) Schools and Churches.

In some of the village schools and churches ventila
crowding existed.

These were the main ways in which the disease sprea
description I have given of ceremonial visiting of the sick
explains the capricious distribution of the disease, one or two
others suffering. In the family, spread undoubtedly took pl
the members having returned from some function such as I

Dr. Watson when Medical Officer in Mlanje in 1936
conditions in what was later one of the more severely affect
gave an average cubic capacity of 1,543 cubic feet with an
feet space person; 38 per cent of houses had windows, bu
open. There is a space in most houses between wall and
that most air currents pass slowly through the roof thatch
The door is usually shut at night except in very hot weath
spread under such conditions. All the factors referred t
Nyasaland, yet meningitis in other tribes is endemic, not e
coincidence that the disease should have covered most of th
out affecting other tribes.

Cerebro-spinal fever had never before occurred in Mla
fact that it was infectious, and in the face of its patchy di
victims, it was difficult to get them to realise this fact.

In Yao and Anyanja country the disease has occurred b
and cases are treated with some circumspection. Possibly s
this suggestion.

Regulations enforced were as follows:—

(1) Funeral ceremonies were forbidden by order. The
the funeral ceremonies postponed until the end of the epid
or holding of the funeral ceremonies was discovered punishn
stoppage of this custom was due to propaganda.

(2) Beerdrinks were forbidden. Once an adequate p
success in this measure was surprising. The measure was
to justify it in the native's eye, there was no co-operation fr
Authorities, mostly Mohammedans, assisted us greatly.
prohibition did no harm; indeed in Mlanje area the nati
planting time probably benefited him at harvest time.

In Blantyre district, however, great distress was caused
the Townships of Limbe and Blantyre crowded; quite a
depends on the brewing of beer which is sold to native
through Blantyre, to restore the economic balance. It may
in the areas concerned fell to a remarkable degree during
in force.

(3) Isolation of sick and contacts. In the infected are
grass huts in readiness for the onset of disease. In one c
the other, members of the family. In some of the more h
built to provide shelter for benighted strangers, police, etc.
unless well backed up by propaganda, the idea of isolation w
isolation in the day were carried back into the village
surrounded by a crowd of friends; these and other errors v
nature of the disease was not realised. In many areas the
the law, being built either in unsuitable places, or with inad
use at all. Personal supervision by Europeans was necessa

(4) Isolation of infected villages. In the case of sm

(5) Disinfection of houses. At the outset of the disease houses were burnt. Although this is in accordance with native custom in the case of *death* from infectious diseases, I am convinced that it led to concealment of the disease among the Anguru, who did not realise its infectious nature. Later this measure was replaced by that of removing the roof for some days. This imposed little hardship and at least prevented the inmates from staying on in the village or entering at night. Towards the rains, however, there was danger of destruction of the walls, and on occasion seed millet stored in the house got wet and began to sprout. During November, therefore, we advised leaving the door open and making adequate windows.

(6) Closure of markets. A few markets were closed in Mlanje. This led to movement of natives to Chiradzulu and Cholo markets and these were for a short time closed. All markets were then reopened simultaneously. There is little danger of meningitis being spread by markets. As a disciplinary measure, to show that this time business really is meant, it is unrivalled. I sometimes used this threat with success when I failed to get co-operation in a district.

(7) Restriction of interdistrict movement. This was attempted, but the force at our disposal proved inadequate. It proved an almost intolerable burden upon District Commissioners, caused repeated friction with planters, and whilst causing disturbance in the supply of labour to Mlanje and Cholo tea estates, did not prevent the native from crossing into infected areas to visit his sick friends or to attend funerals. It may prove necessary in some remote future emergency, such as the advent of cholera, to stop movement. Should this be so the bar might well be a single one, perhaps right across the Protectorate. The entire military force would be required, and the barrier would preferably be made along, not across a road, where this is possible. An example would be a line stretching along the Zomba-Limbe road and on to the border, and probably up either side, shutting off Portuguese natives.

(8) Passes to natives to leave the country were cancelled. Labour recruited in North Nyasa was isolated during its enforced rest at Blantyre and then sent on by train without danger of contamination.

(9) Schools and churches. Schools were closed during the epidemic—church services were held in the open air, and this measure was most conscientiously adhered to even during the early rains.

(10) Sleeping outdoors and ventilation of huts. In certain areas natives were persuaded to sleep out of doors and huts were holed to establish adequate ventilation. This is an exceedingly difficult measure to enforce. Probably quite good results could be obtained by intensive propaganda in areas where the native had become frightened of the disease.

EPIDEMIOLOGY.

The association of influenza with cerebro-spinal fever is well known. During the months November 1936 to February 1937 influenza of a mild type was widespread through Mlanje district.

The onset of the rains probably assisted in the suppression of the disease. The epidemic was however well under control when the rains arrived, and might have been expected to cease of its own accord.

During the months of August and September when some rain fell in Mlanje there was no check in the disease.

In Chiradzulu district it was possible, excluding islets of infection, to define a growing edge of heavy infection and this edge appeared to advance about five miles per week.

It was noticeable that in villages where a number of cases occurred, due probably to neglect of precautions, and in villages where cases were left in their houses, the mortality rate was considerably higher than among cases which were put out in grass huts in the bush.

This is interesting in view of Topley's work on mice—referred to in Hutt and Thomson, Principles and Practice of Preventive Medicine,—in which division of the infected mice into small groups, or change of environment, results in a lower mortality rate.

In this epidemic of cerebro-spinal meningitis the mortality rate for untreated cases was in the region of forty per cent.

From the description given the type of work which had to be done may easily be imagined. Dissemination of propaganda was by no means confined to the medical and administrative departments. The help of members of the European population was solicited and most generously given. It is the nature of the Anguru to disregard advice from strangers; also he only begins to believe a thing when it is dinned into him from all sides. Missions, planters, and tobacco supervisors all assisted. All had a number of educated natives working for them and these were informed carefully of the main features of the campaign and asked to disseminate this information. In this way we gained a number of European helpers who were well known and respected by the native, and had over a hundred educated natives helping in all parts of the affected area.

Concealment of the disease was common. The native suspected that the advent of the disease meant trouble; his suspicions were often confirmed; as far as possible everything was done in a sympathetic spirit, in the hope of securing co-operation, but examples had to be made.

In some areas a house to house inspection was necessary to bring the disease to light. Later, when the native was able to see for himself the result of our work, this became unnecessary. Inevitably medical officers were worried throughout the epidemic with false reports of disease. In all 780 cases were reported. In Mlanje the total was 603, an incidence of 40.2 per 10,000 population. An epidemic of this type leaves an increased number of carriers in the district. Increased endemicity of the disease is inevitable in 1938. A recurrence of the epidemic is by no means improbable. Certain measures have been taken to prevent such a recurrence. The native has had his memory refreshed, and will throughout 1938 repeatedly be reminded, as to how his fathers dealt with infectious disease, and the modifications of custom that are necessary in the case of sickness or death due to meningitis. Beerdrinks were responsible for much of the spread, and the natives have been advised to build well-ventilated beer halls. Should meningitis assume considerable proportions in 1938 they may perhaps be given the alternative of drinking in the open or in such halls, as opposed to the complete suppression of beer. Small foci of meningitis may reappear in almost any part of the areas we have been dealing with. The method of prevention has been well demonstrated in 1937. Possibly the native may in 1938 be allowed to try to settle his trouble himself, with the warning that if he is slack or slovenly, or fails, Government will again take over. I feel that his co-operation, especially if he is allowed to drink beer in the open or in the beer halls, will be most willing and whole hearted. He will not quickly forget the lessons of 1937.

There are certain diseases of which it is said that the cure is worse than the disease. The same may well apply to epidemics. Was this perhaps one of them ? Cerebro-spinal fever at its worst will only extinguish a small percentage of the population. Moreover epidemics are nature's answer to overpopulation and the Southern Province is becoming overpopulated. Unfortunately nature's cures are difficult to control and to keep within bounds. The history of cerebro-spinal fever in other tropical countries, notably the Sudan, suggests that money and time spent in suppressing it at an early stage is money well spent. In any case not everyone has the scientific and far seeing attitude of mind which is engendered by a medical training. A philosophical attitude of *laisser faire*, had it been adopted, might have been mistaken for indifference or inertia.

Finally, cerebro-spinal fever has served as a dress rehearsal for the advent, inevitable in these days of increasing communications, of other and more formidable epidemic diseases. Information has been gained which could not have been obtained other than in the field of practice. On his side the native has learnt, and to many it seemed to come as a complete and most unpleasant surprise, that in matters of medical emergency, if an order is given, it has to be obeyed.

It remains to be seen what the year 1938 will bring forth.

Appendix III.

SOME OBSERVATIONS ON SCHISTOSOMIASIS IN NORTH NYASA DISTRICT

BY

DR. W. L. GOPSILL, Medical Officer.

North Nyasa district, from the River Songwe to Florence Bay, is flat or slightly undulating for a distance of 6 to 12 miles inland from the Lake Shore: further west, the foothills rise steeply and merge into a high mountain range extending the whole length of the district.

The lowland country is the more thickly populated and the majority of the villages are situated in the vicinity of the large rivers or close to the Lake shore: in Kyungu's Section there is a population of over 5,000 within a short distance of Lake Nyasa. Extending for about 12 miles southwards from Karonga—the administrative centre—there is a chain of large villages with rarely more than ½ a mile of country between; they run parallel with the Lake and are situated usually within 2 miles of the shore. Continuing southward, the plains are less thickly populated for the next 8 miles, but, at Ngara, the site of a cotton ginnery, the villages increase in number; the cotton industry has played a large part in their formation. The area between Ngara and Deep Bay is scantily populated but between the latter place and Florence Bay, it increases in density. Generally, the distribution of the villages along the Lake shore is dependent upon the quality of the soil; where it is enriched by alluvial deposits, villages are most numerous.

Inland, the country is well wooded and again villages are found in the proximity of the large rivers.

For a number of years the level of Lake Nyasa has been rising and consequently large areas of low-lying land behind the foreshore have been converted into swamp due either to inundation or to elevation of the subsoil water. These swamps contain large numbers of the molluscs *L. lamenti* and *P. africana* but careful search has failed to reveal any specimens of Planorbis.

Despite the rising Lake, many of the inhabitants of the inundated areas refuse to leave their huts until they become quite uninhabitable. Their pit latrines have been flooded and cannot be reconstructed with the result that those who no longer have this convenience defaecate and urinate in the surrounding swamps. This polluted water is not used for bathing or drinking but the natives wade through it when proceeding to the Lake for their domestic supplies, while travelling from village to village or when attracted to the Lake shore by the arrival of a steamer, etc. In many places some miles of swamp have to be traversed before the shore is reached and the construction of elevated causeways through these waterlogged areas has been found to be the most effective means of preventing infection; a number of causeways have been constructed and the inhabitants are using them as they also afford protection from leeches and crocodiles.

It has been observed that during the rainy season, *L. lamenti* and *P. africana* migrate deeply into the mud forming the swamp bed. During the month of May, it was necessary to excavate to a depth of 3 feet in order to obtain specimens. This observation may be of epidemiological importance for after further investigation, it may be possible to state that during certain months of the year the chance of acquiring schistosomiasis in an endemic area is remote.

Specimens of Limnea were placed in two separate jars containing water, to one of these a number of miracidia of *S. haematobium* were added, to the other, *S. mansoni*. The contents of the jars were kept under observation by means of a large hand lens, and the miracidia of *S. mansoni* only were seen penetrating the mollusc; a similar experiment was tried using specimens of *P. africana*, in this instance only the miracidia of *S. haematobim* effected penetration.

An attempt was made to continue the life cycle by injecting into monkeys the cercaria obtained from the livers of snails infected as above. Up to the time of writing the monkeys have remained free from infection. However, as there are no other water snails in the district and the disease is very prevalent, investigation under better conditions than those obtaining in an out-station may prove that *L. lamenti* and *P. africana* are the hosts.

Specimens of faeces and urine were obtained from a number of the inhabitants of a series of groups of huts situated about 200 yards from the Lake shore. The following table shows the result of microscope examination:—

Group	No. of huts.	No. of inhabitants	STOOLS. No. of specimens containing ova of *S. mansoni*.	URINES. No. of specimens containing ova of *S. haematobium*.
1	6	31	24	21
2	13	34	27	14
3	12	34	31	14
4	1	6	6	—
5	12	35	30	11
6	11	34	25	13
7	11	30	20	6
Total	66	204	163	79

Infection with either *S. mansoni* or *S. haematobium* under the age of 2 years is rare, up to that age children are still being carried and thus have few opportunities to gain access to infected water; of those examined between the age of 2 and 10 years, 80 per cent of male children and 76 per cent of females were infected with *S. mansoni*; in 36 per cent and 42 per cent respectively the urines of these children contained ova of *S. haematobium*. In the case of persons over the age of 10 years 82 per cent of males and 62 per cent of females were found to be passing ova of *S. mansoni*, and, 22 per cent and 38 per cent respectively were also infected with *S. haematobium*. The stools and urines of 50 infants under the age of 3 weeks, whose mothers suffered from schistosomiasis, were examined and found to be negative.

Adults appears to acquire a certain tolerance to *S. haematobium* infection; of 300 natives in whose urine, *S. haematobium* ova were found during routine examination, only 5 per cent came to hospital for treatment for that disease. The remainder suffered no real inconvenience, a number remembered passing blood or of having had pain on micturition in childhood, only a few had taken native medicines in an endeavour to relieve symptoms. Similary, routine examination of stools of patients attending for treatment of diseases in no way associated with schistosomiasis, revealed time and time again the presence of *S. mansoni*, but not however, in the numbers present in specimens collected from cases with acute symptoms.

In an area where malaria is hyperendemic and hookworm prevalent it is impossible to assess the degree of anaemia due to schistosomiasis. The average haemoglobin of 100 natives infected with *S. mansoni* and before the administration of any treatment, was 65 per cent. Two months after a course of antimony injections, the average haemoglobin had increased to 75 per cent though no treatment was administered for the associated hookworm infection; actually, 83 per cent of the cases with a double infection were found to be still positive for hookworm.

A group of 250 school children had an average haemoglobin of 70 per cent. After intensive treatment of the malaria, hookworm and schistosomiasis with which the majority of them were infected, it was found that in 36 per cent of the total, the average haemoglobin increased to 100 per cent, in 29 per cent, to 90 per cent and to 80 per cent in practically all of the remainder.

Complications such as prominent rectal polypi and cirrhosis of the liver are not so prevalent as formerly, due probably to patients attending earlier and also more regularly for treatment. The eye changes, to which I made reference in my article on Schistosomiasis in the Cholo District, (1932 Annual Medical Report. Appendix III) were observed during my investigations in this district also.

Routine treatment with antimony tartarate intravenously proved more effective than any of the modern remedies.

An European case of rectal schistosomiasis occurred in the district. This person was out duck shooting on one occasion during the month of September, 1937, and while traversing a swamp a little water overflowed into his waders; eighty-five days later he developed symptoms and *S. mansoni* ova were found in his faeces.

Nutritional Review of the Natives of Nyasaland.

PREFACE.

Towards the end of July, 1936, a circular dispatch from the Secretary of State* dealing with the subject of Nutrition and its relation to agriculture, public health, etc., was submitted to the Native Welfare Committee for their information, comment and recommendations.

The Committee welcomed the opportunity afforded to them for discussion and speedily came to the conclusion that the Committee as constituted was particularly fitted to give advice to Government on this most important matter and to make recommendations which might assist in the improvement of the dietetic standards of the rural and urban native population.

The Committee after reviewing the practical measures which had already been taken by the various available agencies to raise the general standard of living, considered that further investigations were necessary :—

(*a*) to determine the actual foodstuffs in use in native dietaries and their availability and values ;

(*b*) to measure the supply of labour ;

(*c*) to study the methods of production of native food crops and their relationship to the production of economic crops ;

(*d*) to determine the effects of male adult emigration on village life.

As a preliminary to (a) the Committee drew up questionnaires, copies of which are attached as Appendices I, II, III and IV, for circulation to all administrative officers, to agricultural and forestry officers, to missions, to certain selected Africans and to officers of the medical department.

With regard to (*b*) and (*d*) they recommended that a team consisting of an anthropologist, a medical officer and an analyst should be chosen in order that expert assistance might be available to make a survey of conditions of village life, tribal customs, tabus, racial prejudices, etc., and to make a physical examination of the inhabitants of a district and to collect foodstuffs for examination, tabulation and analysis. A comparison of the extent to which correlation between the several factors exists in the areas to be examined should prove informative as to the measures to be adopted to improve the native's traditional diet in the light of modern information and adapt it more closely to the needs of his environment.

The present memorandum deals with the question of nutrition only from very elementary aspects, from the replies to the questionnaires certain information has been obtained and collated, from medical experience it is known that certain diseases and conditions exist which may be partly attributable to a defective diet.

To obtain a complete picture of present conditions, to have the foodstuffs analysed and their nutritive values determined, to assess the amounts and availability of foodstuffs, their methods of cultivation, to determine how improvements may be effected, to bring home to the masses by education and propaganda the comparative values of staple foods and the advantage to be gained by an extension of the dietary in certain directions, will be the first steps in the general advance towards the improvement of general economic and health conditions.

As Professor Wilson† has recently suggested it may be found out that ill-feeding rather than under feeding is responsible for the somewhat low standard of health and it may be a moot point whether a race is virile because it consumes a high protein diet or whether the virile types choose a flesh diet as the diet *par excellence.*

A. D. J. B. WILLIAMS, O.B.E.
Chairman, Native Welfare Committee.

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* Circular, Secretary of State, dated 18th April, 1936.

† "Diet and Public Health in India" by H. E. C. Wilson, M.B., CH.B., D.SC.

A. A REVIEW OF THE PRESENT KNOWLEDGE OF HUMAN NUTRITION IN NYASALAND.

Previous literature

No special investigations have previously been carried out in connection with human nutrition in Nyasaland, and, with the exception of some observations relating to deficiency diseases which have been recorded in the Annual Reports of the Medical Department it is not possible to refer to any literature dealing with the subject: it is therefore necessary to include in this review material which in other countries has been previously published. The observations recorded by medical officers in the annual reports deal mainly with pellagra. Although other diseases associated with malnutrition have been rarely observed by responsible officers it is not intended to infer that the natives of Nyasaland have hitherto avoided suffering from conditions which are now believed to arise from suboptimal intake of first class proteins, minerals and vitamins, *e.g.* tropical ulcer, conjunctivitis, xerophthalmia, pyorrhoea, dental caries, night blindness, constipation and retarded growth. In 1910, Dr. H. S. Stannus first recognised the presence of pellagra amongst inmates of the Central Prison, Zomba. In the Annual Report of the Medical Department for the year 1913 there is a résumé of the occurrence of the disease during the intervening years. Thereafter, references to pellagra are brief until 1922 when in the Medical Report for that year Dr. Milne-Tough reported 31 cases among the inmates of the Central Prison, Zomba. Despite the improved dietary introduced in 1922, cases continued to be reported and, in the 1924 and 1925 Annual Reports of the Medical Department, Dr. H. M. Shelley contributed some observations on pellagra, and the results of treatment by means of dilute hydrochloric acid and thyroid extract. Pellagra is not confined to the prison population but since the disease was first recognised the majority of cases recorded have occurred among inmates of the Central Prison, Zomba.

Prison dietary

The dietary of long term prisoners in use in 1922 is submitted in Appendix V. In this dietary millet flour is rarely substituted for maize flour and it should be noted that the latter is not prepared according to native custom *i.e.* the whole grain is milled producing *ngaiwa*, a flour which is neither so white nor so fine as *ufa*—the native product. *Ngaiwa* contains more crude protein than *ufa*, and also a higher percentage of ethereal extract (expressed as fat), apart from the valuable constituents of the bran which, in the preparations of *ufa*, are rejected. When first admitted to prison, *ngaiwa* is not appreciated as an article of diet, with some prisoners it is said to cause gastric disturbance. Despite the fact that a prisoner works harder and for longer hours than the ordinary labourer, the majority of long sentence prisoners who have been detained for 2 years and over, show a gain in weight. While it is possible to enforce the use of a superior though unappreciated foodstuff such as *ngaiwa* on a prison community the introduction of this foodstuff into the dietary of a civil population is a different proposition, and so far has not been accomplished successfully. When an attempt was made to substitute *ngaiwa* for *ufa* at the African Hospital, Zomba, objections to it were so definite that rather than upset the growing popularity of the institution the matter was not proceeded with.

Hospital dietaries

In 1934, efforts were made to improve institutional dietaries and with due regard to local difficulties concerning supplies of certain foodstuffs, diets offering suitable alternatives were compiled for the Government hospitals throughout Nyasaland. The full diet issued to patients in the African Hospital, Zomba, is recorded in Appendix VI of this report. It is typical of the rations supplied at Government hospitals. Even this simple diet cannot be provided the whole year round at many of the hospitals. Tomatoes are seasonal in supply and towards the end of the dry season green vegetables are unobtainable in sufficient quantities. The groundnut crop has been a partial failure for several years in succession and the issue has had to be drastically reduced; rice cannot always be obtained. When compared with the physiological standards laid down for Europeans the diet is seen to be deficient in many respects. The amount of first class protein is inadequate, it lacks both animal and vegetable fats, the estimated calorific value is only approximately 2,500 C. daily, but in some respects it is superior to that which the ordinary patient is accustomed to in his own village.

Boarding school dietary

At a mission boarding school* housing over 200 young adults the dietary provided is as follows:—

1 lb. rice; $1\frac{1}{2}$ lbs. *ngaiwa*; 2 lbs. cassava flour, per head per day in rotation.

$\frac{1}{2}$ lb. beans per head per day.

Meat—as available, on an average, $\frac{1}{4}$ lb. per person twice a month.

Salt—sufficient for requirements.

Additional items provided when in season: mangoes, peaches, sweet potatoes, pumpkins.

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*Extract from answers to Questionnaire.

During a shortage of rice the boarders took readily to wheat, 2 lbs. per head per day, cooked in the same manner as maize. A limited supply of wheat is grown in the vicinity.

Labour conditions

The country does not possess any large mining or industrial works and segregation of labour on a scale such as is met with in South Africa does not occur. Some of the larger tea estates employ up to 2,500 labourers during the plucking season but throughout the year numbers may fluctuate by as much as 40%.

Labour employed on estates falls roughly into four classes:

(1) Labourers drawn from adjacent villages to which they return after completion of the daily work. They are paid monthly and receive a weekly payment in cash in lieu of rations.

(2) Tenants resident on estates. They work for a specified period of the year on the estate in abatement of rent; land is provided for them to grow their food crops.

(3) Temporary labourers engaged to cope with seasonal requirements. They are fed but not paid during the period they are occupied in building their huts (2 or 3 days).

(4) Permanent employees housed by the estate employing them. Rations are provided or a weekly payment in lieu thereof.

Legislation

There are two important Ordinances dealing with the provision of rations for labour:

(1) Employment of Natives Ordinance, Cap. 39.
(2) Natives on Private Estates Ordinance, Cap. 43.

The Employment of Natives Ordinance contains the following section:

"During the period of the service of any employee employed at such a distance from his home as to render it impossible for him to return to his house at the conclusion of his daily work, the employer shall at his own expense cause such employee to be properly fed and to be supplied with sufficient and proper means of cooking: provided, however, that the obligation of an employer to cause his employee to be fed or to supply means of cooking as aforesaid, as the case may be, shall not extend to any case when the employee is employed at a place where he can obtain for himself sufficient and proper food and means of cooking, if it has been agreed between the parties at the time of entering into the contract of service, that the employee shall procure his food and means of cooking at his own expense".

Ration scale for labour

The Rules of this Ordinance lay down the following ration scale:—

(1) 12 lbs. maize meal, millet flour, cassava meal or meal made from other grain or hulled rice, per week. Not less than 18 lbs. of shelled maize may be issued in lieu of 12 lbs. of meal at the option of the native, and

(2) 2 lbs. of beans, groundnuts, peanuts or the like per week, and

(3) 6 ozs. of salt per week or 2 ozs. of salt and 2 lbs. of fresh green food such as tubers, pumpkins, gourds, bananas and the like.

The ration shall be issued raw to be cooked by the native labourers themselves: provided, that every employer may erect and maintain a proper kitchen for the cooking of native food under supervision. Employers may in agreement with the native make variations in the specified rations, provided always that such variations do not reduce the nutritive value of the diet.

The Natives on Private Estates Ordinance requires:

"Every resident native shall, subject to the term of this Ordinance, be entitled:

(1) on the estate on which he resides to a site for his hut and to such extent of cultivable land within a reasonable distance from his hut as may be required to grow the usual food crops necessary to the sustenance of himself and family."

Labourers of the classes (1) and (2) referred to above are dependent on their own gardens and earnings for food, class (3) while employed are sure of receiving the ration as required by law but they are restricted to a monotonous diet as they are rarely accompanied by their wives whose duty it would be to cultivate or collect relishes, the fourth class of employee is usually of the semi-skilled type. As such, he is in receipt of a higher rate of pay, and having a garden does not require to depend on the standard ration, so usually takes a cash payment instead. On large estates an ox is occasionally killed and the meat sold cheaply (3d. per lb) to estate employees. Usually, however, meat if required is obtained from the nearest market and costs about 6d. a lb. The monthly pay for unskilled estate labourers—not including the value of rations supplied—averages 6s.: tea pluckers receive more, they are usually paid according to weight of leaf collected. In view of the prevailing rate of pay a labourer is obviously not in a position to augment his ration by the purchase of meat to any appreciable extent.

Cost of staple cereal

Prices of foodstuffs fluctuate widely from year to year. For example, when the supply of maize is in excess of requirements, it may be purchased in the open market at 1½d. for 14 lbs.; in a year of poor harvests the price is increased and at present supplies are costing 1d. for 2 lbs.

It has been estimated that to provide what is believed to be an improved diet for an adult native would cost approximately 3s. 5d. per week at current rates prevailing in Zomba. The quantities of foodstuffs composing this dietary are shewn in Appendix VII.

Dietary of the native general population

A report[*] by the Assistant Director of Agriculture published in 1935 gives an account of the soil, water, vegetation, human and animal population of Central Nyasaland and comments on its economic potentialities. Part VII of this report is devoted to "The people and their food" and includes observations on the policy of the Agricultural Department in connection with the food requirements of the native—the survey was carried out by means of a grant from the Colonial Development Fund. In the Kota-Kota district, 90% of the people belong to the Achewa tribe, the remainder of the population consists of Yaos and Angoni with a few who claim to be Swahili or Arab. Dr. H. G. Fitzmaurice, in an article entitled "Observations on the Native Foodstuffs and Diet in the Kota-Kota District," published in Appendix I of the Annual Report of the Medical Department for the year 1936, gives an account of the local foodstuffs, the method of preparing them, the weight of food eaten by a family of six persons over a period of 25 days, also some details of the weight of food eaten by eleven school girls during one week, with some observations on their development and nutrition.

Nyasaland is inhabited by many tribes. Their basic food is, with few exceptions, the same in every case and either altitude, or proximity to rivers and lakes or the distribution of tsetse fly largely determines the nature of the other foodstuffs in general use.

It is not possible in a review of this nature to comment on all the minor differences prevailing. The following observations are to be taken as representing the conditions and customs of the majority of the native population, they are not applicable to any one particular tribe or district, except where that fact is stated.

Number of meals per day

A number of urbanised natives of the better type are adopting the European custom of three meals a day. Rural natives under normal circumstances take two meals only, formerly one meal a day was the custom and in some places this is still the practice of the aged.

The hour at which the first meal of the day is taken varies according to circumstances. When there is work to be done in the garden, the meal may be eaten very early, i.e. before dawn, or the man may start off for the gardens before it is light and his wife follows later with the food; by the time she has reached the gardens it may be 8 or 9 o'clock. When there is no field work, the meal is taken even later. During the day when supplies are available "snacks" of roasted maize or green maize cobs, groundnuts, cassava or sweet potato are indulged in until the evening meal is due. The principal meal of the day is the evening meal, it is taken about sunset; quite commonly, a portion of this principal evening meal is left over to form the first meal of the following day.

Quantities consumed

When there is no scarcity of food an adult consumes 1½ to 2½ lbs. per day of maize flour prepared as a stiff porridge. Food to a native means porridge and preferably maize porridge or rice, such items as vegetables, meat and fish are regarded as "relishes" while the occasional "snack" is not considered to be food according to native interpretation of the term. In addition to 1½ to 2½ lbs. of flour, or a smaller amount of rice, an adult will eat from 6 to 8 ozs. of green vegetables and 6 to 8 ozs. of beans or other relish daily at the two meals.

Diet of pregnant or nursing women

Practically no change is made in the diet during pregnancy. Some women substitute millet flour porridge for the usual maize porridge or add to the latter a quantity of the bran which is usually given to the domestic animals. Millet and the bran of maize are sources of calcium and phosphorus and it is of interest to observe that women instinctively consume food containing these minerals at a time when a heavy demand is being made upon them to supply the requirements of the foetus.

With the object of increasing the flow of milk, additional gruel made from millet or maize flour is drunk during lactation; beer is sometimes taken for the same purpose.

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[*] "An Agricultural Survey of Central Nyasaland" by A. J. W. Hornby, M.B.E., B.SC., A.I.C., Assistant Director of Agriculture and Agricultural Chemist.

Diet of native infants and children

Native infants are, as a rule, breast-fed. At a very early age—with some tribes on the first day of life—infants are given sweet beer and feeds of *phala*, a thin gruel made from maize flour and water ; frequently the first gruel is uncooked. A spoon is rarely available for feeding purposes. The cupped hand is filled with gruel and attempts are made to empty the contents into the infant's mouth. Resistance is useless, the gruel flows down the nostrils and in the choking and spluttering which follows, a quantity is swallowed by the infant. This is repeated 2 or 3 times daily and sometimes at night. Gradually the gruel is thickened until by the time the infant is able to walk it is receiving the porridge given to adults. This unsuitable and unnecessary addition to the diet of infants is largely responsible for the high infantile mortality from enteritis. Relish is not given with the porridge until a number of teeth have appeared. The salt in the relish is supposed to prevent the teeth appearing.

Breast feeding is not carried out at regular intervals ; when the child cries it is fed in an attempt to quieten it. The child is weaned when the mother becomes pregnant again, otherwise when the child walks, but it is not uncommon to see a child of 2-3 years disputing with a younger member of the family for a share of its mother's milk.

Staple foodstuffs

Maize is the staple foodstuff except in areas where the soil is unsuitable for its cultivation, there, cassava is relied upon. Rice is grown principally for sale ; unless the crop has been a heavy one, only a small quantity is reserved for home consumption on special occasions.

The Wangonde of North Nyasa prepare a flour from dried bananas which is used mixed with maize flour and sour milk. Nowadays, however, there is an increasing tendency to adopt maize as a supplementary diet and it may well be that maize may soon become the staple diet of this conservative tribe. Millet is also used as an alternative to maize in some areas.

Seasonal change in diet

Generally the basic foodstuff is not changed with the seasons, it only varies when there is a shortage of the popular foodstuff. In a normal year there is usually sufficient food grown to supply the needs of the family until the new crop is ready though the margin between sufficiency and shortage is fine. Should the maize be late in maturing or the previous year's yield be below expectations then the green maize cobs of the new crop are used to tide over the interval or a change is effected to cassava or whatever may be available. In some parts of the country, reliance has not be placed on the main maize crop. An Agricultural Officer writing on conditions in the Lower River area states :

" During practically every month of the year maize is being planted with the first rains and harvested in late February or early March ; the second crop is planted in late March or early April and is harvested in June. With good mid-season rains a third crop can be obtained ".

Seasonal shortage of foodstuffs

In cassava-producing areas there is rarely, if ever, any lack of food ; in maize country, some cassava is usually grown as a reserve against famine. Cassava will bear in the most inferior soils, is unharmed by locusts and never fails unless washed away or eaten by such depredators as wild pig.

A real shortage almost amounting to famine occurs from time to time, due generally to failure of the rains, to floods, to a poor harvest, or, as the result of waste. When famine threatens, the size or number of meals is reduced, bran is conserved and the forests are searched for edible grasses, buffalo beans, tubers and wild fruits. Confirmed maize-eaters regard having to fall back upon cassava or sweet potatoes as almost equivalent to starvation.

Customs in relation to food shortage

The system of distribution of food during a time of shortage varies. In some tribes it is a case of share and share alike in the household, with others the children get priority, their needs must be satisfied first, the man of the house comes next and the women have what is left.

Form in which the staple foodstuff is consumed

The staple foodstuff, be it maize, cassava or millet is always eaten in the form of porridge at the principal meals of the day. In all cases a flour is first prepared.

Maize flour.—In the case of maize, a quantity of grain is added to a wooden mortar and the husks removed by pounding. The husked grain is next soaked in water for 24 hours, dried and pounded into flour. The flour is carefully sieved before use to remove coarse particles of husk ; the finished article weighs only about 50 per cent. of the amount of grain taken in the first instance. *Msima* (maize porridge) is made by adding the flour slowly to warm water in a pot on the fire, stirring all the time until the porridge is of the right consistency. It is then boiled until thoroughly cooked. The maize bran is given to the fowls and goats, though it may be eaten by human beings at a time of great scarcity, and curiously enough by pregnant women.

Cassava flour.—The tubers are soaked in water until the outer skin is soft and easily removed, they are then dried in the sun, after which they are stored until required or pounded into a flour from which porridge is prepared in the manner described above.

Millet flour.—This is prepared from the grain by grinding it between two stones. The lower stone has a slightly concave top on which a handful of grain is placed. With a small stone held in the hand and rubbed up and down over the larger stone, the grains are slowly reduced to a flour containing a proportion of husk.

Consumption of meat, fish, milk, etc.

It is not possible to give any true indication of the amount of these items consumed per head of population. Although meat is relatively cheap its price places it out of the reach of the average villager who depends on game, small rodents, caterpillars, flying ants, locusts, etc.—augmented by fish—for his intake of first class protein.

Cattle and dairy produce

In 1936, the number of beasts slaughtered at recognised abattoirs in the Southern Province was as follows:—

Cattle.	Sheep and Goats.	Pigs.
1,948	3,559	286

The Southern Province contains the majority of the European population of Nyasaland and a native population of some 800,000—meat consumption based on these figures would be about 1 lb. per head per annum. North Nyasa is regarded as *the* meat-eating district of the Protectorate. There, 1,000 head of cattle were slaughtered in 1936 giving a *per capita* consumption of about 9 lbs. per annum. An unknown number of cattle and goats are killed on festive occasions or when the owner is in need of money for taxes, etc. The meat is disposed of at the local market to those residing in the vicinity. Meat is popular and its low consumption is due mainly to economic conditions.

The amount of milk consumed varies from tribe to tribe and is dependent more on their customs with regard to it rather than on the amount available. In many cases it is not used, the calves run with the herd and the cows are never milked. The Wangonde of North Nyasa prefer sour milk and in that state it is consumed in considerable quantities by all. Some cattle-owners drink milk in small quantities when it is still warm and others use it mixed with water for making gruel or porridge, but, on the whole, it is not regarded favourably by adults and if it is available and local custom does not prohibit its use, it is given to the herd boys and children. Ngoni men will drink milk at a time when food is scarce; normally the females of that tribe do not take it, but, if granted a cow according to tribal custom i.e. *chuma*, or part of the dowry transaction, they will then make full use of its milk. In the vicinity of Zomba, Blantyre and Limbe, viz., the larger European centres of population, educated natives are now purchasing milk for family use. Goats' milk is never drunk, the native considers its taste and smell objectionable.

In some areas cattle are few owing to tsetse fly or poverty and the supply of milk is so limited as to be negligible.

Fish and fishing industry

On the Lake shore there is a considerable industry in the smoking and drying of fish for sale. Curing is done in a very indifferent manner and by the time the dried fish is offered for sale at inland markets, it is often in a semi-putrified state and grossly contaminated by flies: this however does not appear to reduce its value or attractiveness to the native. From August to February fish are plentiful and the villager of the Lake littoral is able to satisfy his needs cheaply, during the other months of the year fish are difficult to obtain and stocks of cured fish are soon exhausted or become unfit for sale as the curing processes adopted merely delay the onset of putrefaction for a limited period.

Fish is more generally used than meat, but it is not possible to state the amount consumed per head. Some idea of its popularity may be gained from the fact that sales at a small inland market increased from 15 tons in 1934 to 32 tons in 1936. Fish and meat play a minor part in the native dietary—they are not regarded as "food," but as "relishes" to be taken with food, i.e. some form of porridge.

Miscellaneous foodstuffs

Although almost every hut has its quota of "chickens" they do not figure with any degree of regularity on the menu of the rural native. They are reserved for ceremonial occasions, for the payment of fees connected with ceremonies, or, if a market is available, for sale to Europeans. Eggs are also neglected as an article of diet either on account of tribal tabus or because they are regarded as potential chickens, some natives frankly state that they do not care for them. Children on occasions rob the nests of wild birds and roast the eggs before eating them.

Tea is being used more and more by the urbanised native who has copied the European in this respect. A universal demand will improve the prospects of the local tea industry and necessitate the use of more milk and sugar.

"Relishes"

Although "relishes" of meat and fish are the most popular, the local vegetable relishes play a very important part in the native dietaries, for a "relish" must be available to serve with the porridge. Relishes are cultivated and uncultivated. In some cases the roots of the plants are used, or it may be the young shoots, the leaves, the seeds or the flowers; edible fungi are much sought after as relishes, they are plentiful during the wet season. Some o these relishes are cooked and eaten the day they are gathered, others are cooked, then dried and kept for future use.

Types of vegetable "relish"

The following are much used as green relishes:—

Pumpkin leaves
,, flowers
Cucumber leaves
Leaves of beans (many varieties)
Cassava leaves
Pea leaves
Young shoots of *Portulaca oleracca*,
Sweet potato leaves
Wild spinach
Burr weed
Leaves of the rubber tree
Groundnut leaves
Leaves and shoots of a plant resembling *Ipomca*.

There are also many forest shrubs in use towards the end of the dry season when the gardens are bare. The villager is in a position to maintain his requirements of green relish throughout the year but for some months it may necessitate a prolonged search to obtain adequate supplies.

A number of forest shrubs used have not been identified, but great progress has recently been made and the list of recognised plants is now very comprehensive. There is, however, no knowledge available as to their nutritional properties. These wild relishes are rarely offered for sale at a market in sufficient quantities to supply the needs of a large institution such as a hospital.

Beans of many varieties, peas and groundnuts are also classified by the native as relish. Beans are of considerable importance owing to their protein content and are the main source of this element. Groundnuts are almost the sole source of vegetable fat, they are seldom eaten as a relish unless accompanied by beans, tomatoes or a green vegetable.

Fruits and fruit trees

Such fruit trees as exist are almost invariably the result of chance germination, the actual expenditure of labour being limited to the construction of a protective fence to limit the activities of the village goats. The native is not inclined to plant for posterity: he wants immediate results and the fear that he might die and someone else reap the harvest militates against the planting of fruit trees.

The varieties of cultivated or wild fruits available vary from district to district. Pineapples, mangoes, guavas, paw-paws and bananas occur at lower levels and, these in addition to peach and citrus trees are found growing at higher altitudes. All these fruits are eaten when obtainable; mangoes are very popular with young and old, they are in season at the period when stocks of foodstuffs are likely to be running low. Forest wild-fruits are mostly eaten by the younger members of the community and are only sought seriously in a time of extreme scarcity of cereals.

Indigenous trees

The following are some of the common indigenous tree fruits eaten fresh when in season:—

	Native name.
Cordyla africanum	Matondo
Adonsonia digitata	Mlambwi
Uapaca spp.	Masuku
Hyphenae crinata	Ngwalangwa
Borassus flabellifera	Mavumo
Thespesia spp.	Motowo
Zizyphus jubjuba (var.)	Masau
Ximenia americana	Mpinji
Tamarindus indica	Mbwemba

The *masau* fruit is similar in appearance to a very large cherry. It is to be found in abundance and is eaten both fresh and dried, a native alcohol "*nipa*" is distilled from it. In Appendix VIII there is a list of identified trees and shrubs, which, according to native evidence, bear edible fruits. The list contains also particulars of five trees and shrubs with edible roots and six edible leaves. The Conservator of Forests has supplied these details.

Cultivation and use of European vegetables

Tomatoes are the most popular of all the European vegetables introduced into this country. Except where they are grown for sale to Europeans the plants are not cultivated but are self-sown, with the result that the fruit has gradually become diminished in size. Tomatoes are generally used mixed with an indigenous "relish" e.g., groundnuts or pumpkin leaves. Lettuce and cabbage are less commonly cultivated for consumption by the rural native, they are grown principally for sale; lettuce if used is not eaten raw. The European type of spinach is rarely grown as supplies of wild spinach are available at most seasons of the year. Potatoes are grown mainly for European consumption. This vegetable is not much appreciated by the native and the area under cultivation is limited. Onions come next to tomatoes in popularity, they are grown both for sale and home consumption. The practice of cultivating these vegetables and, to a lesser extent, carrots and turnips, for home consumption is growing, largely as the result of production exceeding European demand and compelling the grower to consume his surplus.

Salt—its use and preparation

Salt is always added to the relish which accompanies the porridge, no meal can be cooked and served without it. In many parts it is purchased from the local store or obtained from Europeans in exchange for eggs. A locally prepared "salt" is used by those unable to procure it in this manner; it is not the sodium chloride of commerce to which the name *mchere* is applied, the local substance is called *chidulo*, i.e. "water made salt from ashes." *Chidulo* is obtainable from many plants, papyrus, reeds, water lettuce, certain grasses, trunks of banana trees and from the fan palm (*ngwalanga*). On the Lake shore, papyrus is regarded as the best source. The method of preparation is as follows. The plants are dried and burnt and the ashes obtained placed in a small basket. Cold water is poured over the ash and the fluid which percolates through is caught in a pot. The resulting dark-coloured liquid, if too salty, is diluted before use. The ash may be stored and the liquid prepared as required. In some districts kraal manure is used. The manure is dried, burnt and the resulting ash treated in the manner described above. Formerly a "salt" was obtained from the soil of certain marshes; this method has been practically abandoned.

A complete analysis of these locally prepared "salts" has not been made.

Consumption of beer

The manufacture and consumption of beer varies according to the amount of material available. There are certain ceremonial occasions when beer is indispensible but in some districts it is brewed and consumed the whole year round, often to the detriment of food supplies. Although excessive drinking and the misuse of food supplies are to be deprecated, taken in moderate amounts, beer must be regarded as a valuable food.

Food "tabus"

On the whole, food tabus were never applied widely enough to affect the nutrition of the people and some of the tabus are not now so strictly observed as formerly. Tabus are principally tribal, families and individuals as such do not have them. The Ngoni have patrilineal totemic clans and the clan animal is not eaten. The Yaos practice the religion of Mahommed and will neither kill nor eat pigs. For this reason pigs are numerous in Yao country and cause considerable damage to growing crops. Some non-Mahommedans refrain from eating pork, it being held by them that such meat causes leprosy.

There is the tabu against giving a child salt before it cuts its teeth which has been referred to in a previous paragraph. Salt tabus are numerous but are of little importance from a dietetic point of view.

Cash crops

Nyasaland is not a food-exporting country, its main export cash crops are tobacco, tea and cotton. 1936 was an exceptional year, as some 500 tons of maize were exported.

A certain amount of inter-district trading occurs but only the surplus is so disposed of. The districts of Karonga and Kota-Kota once exported to other districts many tons of rice every season but the rising Lake has interfered with the cultivation of this crop, and the quantity available has been very much reduced. There are, however, indications of a revival of the rice trade.

The villager in the vicinity of the larger centres disposes of his surplus food crops to employed natives who have no gardens; occasionally owing to unforeseen circumstances this results in the grower running short of food. A certain exchange of commodities by barter occurs between individuals, e.g. maize from the hills is bartered for fish.

The principal native cash crops are tobacco and cotton. As a rule the cultivation of cash crops does not adversely affect the production of food crops, the men attend to the former while the women are responsible for the latter. Previously, if the price of cash crops remained stable for two or three seasons in succession, there was a tendency to reduce the area devoted to food crops, but low or falling prices have taught the native not to sacrifice his food supply in the hope of receiving a large return from cash crops.

Cattle exports and sales

The activities at the Lupa Gold Fields, Tanganyika Territory, have resulted in a demand for cattle and over 1,200 were exported from Karonga in 1936. Considerable numbers of hides were also exported from North Nyasa and the people of that district are enjoying a period of unprecedented prosperity. The cattle population of the North Nyasa district is about 40,000. A considerable increase has occured in recent years owing to a reduction in the number of deaths of calves from East Coast fever. Castration of scrub bulls has been encouraged and there is a marked improvement in the condition of herds. Increased prosperity has resulted in a greater demand for meat and, during 1936, over 1,000 head of cattle were slaughtered at Karonga for consumption by local natives.

Animal husbandry

About 95% of the cattle of the country are located in the Northern Province Until comparatively recently owners refused to recognise the commercial potentialities of their herds. Except in the North Nyasa district milk was not generally used other than by children, animals were kept largely for dowry transactions, scrub bulls predominated and there was a heavy mortality of calves from East Coast fever; stock was rarely killed for consumption except in times of shortage or on ceremonial occasions; disease was rife owing to the prevailing ignorance of animal husbandry. This state of affairs is gradually changing, mortality from East Coast fever has been checked by a system of dipping, scrub bulls are being weeded out or castrated, owners are improving their kraals and stock is being exported to markets in the Southern Province in increasing numbers. The cattle population is capable of withstanding this demand and the gradual elimination of scrub bulls is resulting in a slow but steady improvement in the condition of animals marketed for slaughter.

In the Mzimba district, a ghee industry was established by private enterprise under European control. Milk was purchased at a number of buying centres and, after separation of the fat content, skim milk was returned to the vendors.

Agricultural methods and customs

There is no pastoral tribe in this country comparable with the Masai of Kenya, for although cattle, sheep, goats and pigs are kept, the people are concerned mainly with agriculture.

Land is owned by the community, though cultivation is, with few exceptions, individual. Each family hoes its garden, but the clearing of a new garden may be communal. Hoeing for beer is the communal practice of the people. The employment of labour for payment is very much on the increase among the permanently employed and educated classes. Most of this labour is alien and prepared to work for low wages and food. Gardens vary in size from 2 to 6 or 7 acres in extent; in certain areas a larger acreage is required for the cultivation of the family food supply. Numerous factors influence the size of a garden, viz., the size of the family, climatic conditions, custom, the nature of the soil and the variety of crops grown. Very few gardens are ploughed. Seeds are sown in small mounds of earth scraped together by means of a hoe, larger mounds are used for the planting of sweet potatoes and cassava; the ridge and furrow system is rarely adopted. There is no system of crop rotation practised in connection with the cultivation of food crops. When a patch of land is exhausted—as indicated by a poor yield—a new area is opened up and the old allowed to revert to a natural fallow, or the crop is changed from, say, maize to cassava. Propaganda is being carried on in many districts with a view to encouraging crop rotation, so far with but little success.

Manure

The benefits arising from the use of kraal manure or compost are appreciated in very few districts, in the majority of instances the soil is dependent for enrichment upon the ash resulting from the timber burned during the initial clearing, on the grasses and weeds contained in the mounds of earth raised for planting the seeds or tubers, or, upon millet or maize stalks cut and laid over the garden area and allowed to rot. Where tobacco is grown the native is copying to some extent the example of the European planter and is using compost and kraal manure in his tobacco gardens, but, as yet, the possibility of increasing the yield of food crops by manuring has not been appreciated in most districts. Since the early uprooting of tobacco was enforced, some native growers sow a type of bean just before the tobacco is harvested, the soil is enriched by this means and a good crop of beans obtained. Owing to the presence of tsetse fly there are many places where cattle cannot be kept and consequently kraal manure is unobtainable.

Soil erosion and the cultivation of millet

Finger-millet replaces maize in a few localised areas, in many districts it or kaffir corn is grown in addition to maize. The usual method of preparing a garden for finger-millet in some areas is a very uneconomic one for it denudes the country of timber and encourages soil erosion. Trees are cut down over a wide area, the dried wood is collected into a pile 3 or 4 feet high and burned, after which the ash is roughly hoed into the ground. The size of the garden is small in comparison with the area denuded of timber and a new garden is prepared every 2 or 3 years. In the southern part of the Protectorate, finger-millet is usually grown in small patches amongst other foodcrops. Heating and partial sterilization of the soil is accomplished by burning grass heaps. Much of the crop is used in the manufacture of beer.

Cultivation of groundnuts

Groundnuts, almost the sole source of vegetable fats, are not cultivated to the same extent in every district. In the Lower Shire area only about 5% of families plant them, in Lilongwe, Fort Manning, Kasungu and the highlands of Dowa and Kota-Kota, groundnuts are to be found in some 80% of the gardens. This crop is not regarded as a foodstuff, it is only a "relish." In recent years consumption is believed to have decreased (*a*) owing to several poor harvests and consequent shortage of seed and (*b*) with a growing European and Asiatic demand, the native is selling what he would normally consume.

Cultivation and use of soya beans

Attempts have been made to popularise the cultivation and consumption of soya beans by native growers. Cultivation as a cash crop has met with some success but the bean has not yet been appreciated as an article of diet owing to the necessity for preliminary treatment and prolonged cooking. The Assistant Director of Agriculture in a pamphlet issued locally has shewn that, using 1 lb. of Herman beans and giving a preliminary soaking in water for 12 hours, removal of the husk took 65 minutes and the actual cooking 2 hours 10 minutes; treated for 5 minutes with boiling water, the time taken to remove the husks was reduced to 20 minutes but the cooking time was extended to 3½ hours. To improve palatability the addition of 10% tepary beans is advocated.

Yield of food crops

The yield of any crop is dependent on many factors e.g. standard of agriculture, soil fertility, seed, weather conditions, pests, etc. It is estimated that over a period of years, the average yield of staple foodstuffs from native gardens is roughly as follows:—

Maize	700—1,000	lbs.	per	acre.
Millet	400— 600	,,	,,	,,
Cassava	900—1,200	,,	,,	,,
Sweet potatoes ...	700—1,000	,,	,,	,,

It is generally agreed that the native family could produce more food without additional labour by adopting better methods of agriculture. In spite of constant propaganda and instruction, the native is slow to alter his customs.

Suitability of soil for cultivation of European vegetables

Generally the soil is suitable for growing such vegetables as tomatoes, lettuce, onions, cabbage and turnips. In some areas, e.g. the Lower Shire, parts of South Nyasa and Upper Shire, climatic conditions are unsuitable though some success can be attained in *bottomlands* during the cooler season of the year. As a rule, to achieve any measure of success entails the expenditure of more trouble than the native is prepared to exert on what he regards as a "relish." In the vicinity of European centres, tomatoes, lettuce, onion, cauliflower and cabbage are cultivated as cash crops, and more attention is devoted to them.

Dietary deficiencies

Analyses which have been made of several of the locally grown beans viz., velvet beans (black and white), Florida beans, *mbwanda* beans, soya beans, and chick peas are recorded in Memorandum XIII issued by the International Institute of African Languages and Cultures. No other common foodstuffs of the country have been analysed. In the absence of adequate data it is not possible to assess the value of local diets, values estimated for similar foodstuffs grown in other countries cannot be accepted as a basis for calculation.

It is assumed that the total caloric requirements of the native are satisfied by his usual diet; how far this diet falls short of the optimum or even the minimum requirements with regard to protein, fats, minerals and vitamins can only be assumed.

According to the standards accepted for non-tropical races the natives' intake of first class protein is inadequate, more especially during the important periods of childhood, pregnancy and lactation; the consumption of fats is also too low when measured with the same standards, furthermore, it is mainly of vegetable origin; the intake of carbohydrate is adequate, if not excessive. Death from starvation is practically unknown.

Highly protective foodstuffs are represented in the native dietary by milk in limited quantities and available only, to any extent, in the Northern Province, also by tomatoes, green vegetables and fruit. As has been stated in a previous paragraph, supplies of fruit and vegetables are seasonal and, at times, unobtainable. The intake of vitamins A and C during certain months must be reduced to a dangerously low level, particularly the latter, as it is not customary for vegetables to be eaten uncooked. The tendency for the native to adopt European attire is to be regretted for it is bound to limit the synthesis of vitamin D which occurs by irradiation of the skin, and foods containing this vitamin do not figure to any extent in the usual dietary. In is probable that local diets are deficient in calcium and phosphorus, yet a valuable source of these minerals *i.e.* the bran of maize is given to domestic animals.

Deficiency diseases

The grosser manifestations of deficiency disease are undoubtedly rare. There is a high incidence of catarrhal affections, conjunctivitis and tropical ulcers, which may be regarded as indicating a latent state of malnutrition in the population.

The average height and weight of several small groups of African children in Nyasaland aged 10 years and upwards have been found to compare unfavourably with English children of the same age; under this age, differences are slight. Below the age of 10 years nutrition is reported to vary from fair to good and deviations from the normal have been attributed to helminthic infections. G. B. Worthington in an article entitled "The Food and Nutrition of African Natives," *Africa*, Vol. IX, No. 2, April 1936, refers to the possibility that infestations with intestinal parasites favours the development of malnutrition and food deficiency by interfering with digestion and absorption; examination of the stools of 1,242 children aged 2—10 years during a series of medical surveys in Nyasaland showed 59% to be harbouring intestinal parasites.

B. A REVIEW OF THE FURTHER STUDIES AND RESEARCHES ON THE SUBJECT WHICH APPEARS DESIRABLE.

Analyses of the foodstuffs in general use

A knowledge of the composition and digestibility of the common foodstuffs is necessary before any extensive programme of propaganda or education on the subject of nutrition can be embarked upon. Institutional diets are not at present based on scientific data, they are merely native diets modified empirically and appear to be adequate quantitatively, if not qualitatively.

Analyses of foodstuffs both in the raw and cooked state are required to determine the differences which result from native methods of preparation and cooking. Particular importance is attached to analyses of the wild plants and other relishes which are available when cultivated green vegetables are unobtainable.

An anthropological and nutritional survey

It is obvious from the section of this report dealing with the present knowledge of human nutrition in the country that it contains little information of scientific value. Although the dietetic customs of the people do not differ sufficiently widely to permit a comparative study to be made on the lines of that conducted by Sir John Orr and Gilks in Kenya, investigation of the milk, banana, maize and meat-consuming Wangonde of North Nyasa and of the cassava-eating Atonga of the West Nyasa district should provide valuable data. If arrangements could be made for Dr. Read—who has already made an anthropological study of the Ngoni—to be a member of the staff of the nutritional survey, it is suggested that the investigations should be conducted in an area of Angoniland and, as a contrast, in a Lake shore district populated by the Wangonde, or the Atonga or the Achewa.

Nyasaland has not the financial resources available to equip, staff and maintain research units capable of undertaking the work involved and it is considered that future studies on nutrition should be directed by the recently constituted Standing Committee on Medical Research in East Africa; in this connection it is interesting to learn that this Committee has recently recommended that Nyasaland should be the territory chosen for the nutritional survey to be carried out by the International Institute of African Languages and Cultures.

An investigation of the fishing resources of Lake Nyasa

The fishing industry is of considerable importance in the economics of the country. In 1930, it was estimated that not less than 10,000 were employed in fishing or marketing this commodity. The industry has been permitted to develop undirected and almost without control. At certain seasons of the year fry are caught in considerable numbers; permits have been issued to non-natives to fish for trade and this has resulted in the use of nets of a more efficient type. Fishing is carried on throughout the year except when weather conditions render it either unsafe to venture on the Lake in the primitive dug-out used by native fishermen, or, inadvisable to lay nets owing to risk of loss or damage. Although there is no evidence to support it, it is believed that the indiscriminate catching of fry and the introduction of modern nets may result in a serious depletion of the natural resources of the Lake.

Investigation by a fishery expert is required in order that advice may be obtained on the potentialities of the Lake, and on measures to conserve the natural resources so that regular supplies may be available for consumption.

C. A REVIEW OF THE PRACTICAL MEASURES WHICH HAVE BEEN TAKEN IN THE PAST TO APPLY SCIENTIFIC KNOWLEDGE TO THE IMPROVEMENT OF NUTRITION.

Provision of free milk for school children

Arrangements have been made whereby native children attending a school in the Northern Province are provided daily with free milk. A doctor attached to a mission in the vicinity is co-operating in the experiment by maintaining records of heights and weights of the pupils.

Establishment of native markets

Native markets have been established at many of the larger trading centres; accommodation has been provided for the sale of meat and fish. A suitably located market attracts large numbers of customers, dealers in meat and fish have been encouraged to provide supplies knowing that the risk of loss from lack of trade is reduced to a minimum in these circumstances.

Women and child welfare centres

A number of centres are in operation throughout the country; one is staffed and maintained by Government, the remainder are provided by mission enterprise aided by Government grants. Owing to lack of funds it is not possible to open centres which were built at Government hospitals some years ago. The available centres are doing good work but are able to serve only a small section of the community.

Institutional dietaries

Steps have been taken at Government institutions to improve the dietaries by the provision of increased amounts of first class protein, fruit and vegetables.

Training of community workers

The schedule of training for male community workers is outlined in the "Report of the Native Welfare Committee for the year 1936." The scheme has not been in operation long enough for it to be commented upon, but, if pursued as originally envisaged, the activities of a sufficient number of these trained workers, should, in course of time, effect a marked improvement in the nutrition, health and economic state of the people.

School gardens

Gardens are established at many of the village schools. They are used mainly for demonstration of nature studies and have little value as media for instruction in improved agricultural methods or encouragement of new foodcrops.

Experimental station

Experimental stations in charge of officers of the Agriculture Department have been opened at suitable centres. Improved agricultural methods are demonstrated and the potentialities of new food and cash crops are investigated. Seeds of proved fertility are distributed and efforts are made to encourage the cultivation of foodstuffs with a high protein content.

Development of native cattle

The Veterinary Department has been compelled, as its European personnel is small, to concentrate on the treatment and prevention of animal diseases. Africans are being trained to carry out routine duties enabling qualified European staff to devote more time to field work. In the cattle-raising districts of the Northern Province, practical demonstrations have been given of the advantages to be derived from improved methods of animal husbandry. The native butchery trade has been encouraged and the possibilities of manufacturing cheese and popularising it as an article of diet are now being investigated.

When the company operating the ghee industry in Mzimba district ceased operations, the Veterinary Department started a demonstration farm in the area at which the manufacture of ghee, amongst other things, was taught. Considerable interest was shown by the natives and it is hoped to extend the experiment if the necessary staff for supervision and training is forthcoming.

Propaganda

In 1935, the Medical Department for the first time staged a health exhibit at the local Agricultural Show. Exhibits in subsequent years have been enlarged and made more interesting by the inclusion of a display of foodstuffs arranged to to show the quantities and combinations of a better and more varied diet. This exhibit always attracts a large number of visitors and is of special interest to employers of labour.

Domestic science

Domestic science forms part of the curriculum prescribed for certain classes in girls'schools.

The number of European ladies on the staff of mission schools who are in possession of domestic science qualifications is small. Since 1933, however, when domestic science was first introduced into the curriculum for African Women Teachers, 35 certificates of competency have been issued. Holders of this certificate give instruction on domestic science in girls' schools.

Domestic science is taught to the wives of all students attending the Jeanes Training Centre. These include wives of Native Authorities, Community Welfare Workers and Jeanes Supervisors. Teaching of this subject is in charge of two European nurses, who, though qualified midwives, have not received special training in domestic science.

Training of African midwives and nurses

Women have been encouraged to come forward for training as nurses and midwives. Instruction is given in infant dietetics as well as general nursing.

D. A REVIEW OF THE FURTHER MEASURES WHICH IT APPEARS DESIRABLE TO TAKE IN THE FUTURE.

The problem of nutrition in Nyasaland is associated with many factors of which the more important are :—

(*a*) Poverty and disease.
(*b*) Inadequate transport facilities for the distribution of food.
(*c*) Inadequate and inefficient facilities for the storage of food.
(*d*) Lack of imported foodstuffs at a time of seasonal shortage.

Poverty and disease

A native labour census was taken in August, 1930, and the following statistics were obtained.

Actually at Work.

Total number of skilled natives (including clerks, bricklayers, mechanics, etc.)		Total number of unskilled labourers (including carriers, watchmen, cultivators etc.)		Total number of domestic servants	
Male	Female	Male	Female	Male	Female
10,655	204	41,115	4,895	252	252

Out of a total of 60,044 employed males and females, 14,737 were in receipt of a monthly wage of 6s. or less, 42,253 were paid between 6s. and 20s. per month.

The estimated native male population, including children, on 31st December, 1929, was 625,537, and of these 56,655 were in employment. The Census Report suggests that 33 per cent. of the total male population is accounted for by children and states that the number of males aged 17 to 45 years is approximately 300,000. Natives working on their own account or for other natives are not included in the employment figures quoted above. It is stated that some 32,000 were engaged at growing cotton for sale and 48,419 were registered as tobacco growers. In addition, the Report of the Committee appointed to enquire into Emigrant Labour, 1935, estimated that the total number of Nyasaland natives at present abroad was in the neighbourhood of 120,000, chiefly in the Rhodesias and the Union of South Africa.

In the absence of any large mining or industrial concerns and owing to a surplus of unskilled labour, wages of this class of worker are maintained at a low level. A labourer's wage varies from 6s. to 8s. per month with a payment of 2s. per month for food or rations in lieu thereof, and out of this income an annual payment of 6s. hut tax must be made to Government. Villagers residing in localities where regular employment is not available obtain the money necessary for the payment of this tax either by the sale of their garden produce, live-stock and cash crops, or from relatives employed in South Africa or Rhodesia. Prices obtainable for cash crops are low in accordance with conditions prevailing throughout the world for agricultural produce and the amount that can be cultivated for food and cash crops under the family system is limited ; the return, therefore, is so low that there is little incentive for the average native to produce more than is necessary to feed himself and his family according to custom and to earn sufficient to pay his liabilities to Government in the form of hut tax.

A considerable proportion of the population suffers from ankylostomiasis, schistosomiasis, ascariasis, or other helminthic infections of the alimentary tract ; malaria is hyperendemic. Although insanitary surroundings are primarily responsible for the spread of these conditions, poverty and ignorance contribute to their dissemination.

Transport

The main road system of the Protectorate compares most favourably with that of other African territories. From Lake Nyasa, a lorry loaded with fresh fish runs daily to the three principal towns, i.e. Zomba, Limbe, and Blantyre. Owing to the increased cost arising from carriage of the commodity for a distance of 75 to 120 miles, fresh fish is not purchased to any extent by natives. The value of a bicycle for transport purposes is realised and large quantities of smoked or partly cured fish are delivered regularly to the African residents in these and other areas by enterprising natives. There are only five roads suitable for wheeled transport extending from Lake Nyasa to the western area of the Protectorate, serving a coast line of approximately 300 miles. Supplies of fish are conveyed to the hinterland by head-loads mainly, and this primitive form of transport results in forcing up the cost to the consumer. In the cattle-rearing areas of the Northern Province there is a surplus of milk, which, owing to lack of suitable transport, cannot be conveyed to potential consumers in the Southern Province where cattle are less numerous.

Storage

There is as yet no system, such as exists in civilised countries, for the distribution or for storage of foodstuffs during periods of seasonal shortage. The native granary for storing cereals, etc., consists of a cylindrical framework of reeds coated with clay, mounted on a low platform; the top usually has a grass roof to protect the contents from damage by rain. Each household endeavours to store in a granary of this type sufficient of the staple cereal to provide the family unit with food from harvest to harvest. The structure is not ratproof and considerable wastage results from the depredation of vermin. Examples of a ratproof grain store have been demonstrated but the native displays considerable apathy towards what he regards as a European innovation.

Imported foodstuffs

Adjacent territories are not in a position to export foodstuffs such as fish and green relishes during the months of the year when a seasonal shortage of these articles occurs in Nyasaland. Even if supplies were available the financial state of the majority of the population would reduce the demand for these commodities to a negligible figure and the lack of transport facilities would prevent rapid and regular distribution.

General measures to effect improvement

It is obvious that the standard of living must be raised before a substantial improvement can be anticipated from any other measures which may be advised, and it must be emphasized that this can only be achieved by the combined efforts of the technical departments mainly concerned, viz., Agricultural, Education, Health and Veterinary, working in harmony with and receiving the full co-operation of the District Administration and the Native Authorities. The country apparently does not possess any mineral wealth. Employers of labour are not in a position to increase wages, although they might be prepared to accept recommendations regarding an improved dietary, if assured that it would result in increased efficiency and better health. Employed labour forms a small proportion of the total population and the problem of the majority remains unsolved. Schemes to improve the nutrition of the people must be associated with a better sanitary environment. Trained African sanitary inspectors, dispensers, agricultural and veterinary instructors, Jeanes teachers and community workers should be provided in sufficient numbers to ensure that every village is brought under the influence of one or other of these workers. A balanced diet may improve physique and the resistance of the body to disease, but alone will not solve the problems of the country in so far as they relate to parasitic and protozoal diseases.

Training and education of women

The important part which women play in the economy of the household cannot be stressed too frequently. Woman is the cultivator and harvester of the food crops and is also responsible for cooking the family meals. Despite the position held by women in the household there is but little attention paid to their general education, and even less to their education in domestic science. It is desirable for educationalists to concentrate on providing native girls with training in domestic science in addition to instruction in the three "Rs". Expansion of domestic-science teaching is essential if the African girl of to-day is to be capable of taking an active part in the efforts now being made to improve conditions in the household.

Schools

The adult native adopts a conservative or apathetic attitude towards European instruction; children of both sexes are more receptive and more time should be devoted in the schools to teaching the principles of nutrition and hygiene — even though this may necessitate curtailing the hours devoted to education in the three "Rs" — in the hope that a knowledge of these subjects may eventually create a demand for better conditions.

Elementary hygiene is included in the curriculum of training for students attending the Jeanes Centre and it would be of advantage to introduce into the syllabus a course of lectures on dietetics. The diets at boarding schools are unsatisfactory and unsuited to the needs of adolescents. Government must be prepared to receive requests for increased grants-in-aid immediately a revision of the present dietaries is demanded.

Women and child welfare centres

Extension of this service by the provision of trained health visitors and an increase in the staff of certified African midwives would permit contact to be made with a greater number of native women and enable the trained personnel to advise them on the management of their homes, the importance of diet during pregnancy and lactation and the rearing of their children.

Propaganda and education

Until analyses of the various foodstuffs grown or consumed in the country are available it is not possible to submit a definite policy with regard to propaganda and education in connection with nutrition. When scientific data are available, it is advised that a simple text book should be compiled, suitable for the guidance of African teachers and others giving instruction in this subject. Intensive propaganda should be instituted by means of displays of suitable diets, by pamphlets distributed to educated natives and employers of labour, to bring to their notice the potentialities of the country from the point of view of its ability to provide a balanced dietary and the advantages to health and efficiency by its use.

The fishing industry

Local methods of curing fish for native consumption are unsatisfactory. Investigations should be undertaken to evolve a form of treatment which will improve the keeping qualities of cured fish, either by prolonging the period of smoking and drying or by the introduction of an equally simple but more efficient process.

Better methods of preservation would diminish the quantity of fish wasted by premature decomposition, allow stocks to be accumulated in the fishing season for sale during the months that the industry is at a standstill owing to the state of the Lake and the rivers entering it, and enable fish to be transported to and offered for sale at villages far removed from the source of supply.

Agricultural Department

The measures advised by the Acting Director of Agriculture may be considered from the following points of view:—

(*a*) Better supply of proteins both in quantity and kind of protein.
(*b*) Better supply of oils.
(*c*) Larger supply of all vitamins.
(*d*) Greater reserves to be stored: root crops such as cassava, taro, potato, edible canna, yams.
(*e*) Mineral deficiencies to be made up by salts. Deficiencies in natural waters generally to be rectified.

(*a*) The lack of proteins in the average native diet is well-known. Too much reliance is put on maize by the greater number of natives and it should generally be supplemented by protein from meat, fish, groundnuts, soya beans pigeon pea or other leguminous seeds.

The meat supply may easily be increased and this is connected with the institution of better small-holdings, care of cattle, elimination of internal parasites from young animals and humans. Correct manufacture of Indore compost helps by eliminating flies and fly-borne diseases.

(*b*) The supply of oils is generally correlated with the supply of vitamins. Groundnuts and soya beans supply a very desirable edible oil and increased production should be encouraged by all officers concerned. The production has been sadly neglected during the past few years. The export of oil seeds, even cotton seed, should be carefully watched and it may have to be enforced that all such seeds should be extracted in order that the residue, rich in protein and containing some oil, may be available as human food, as cotton seed even may be.

Instruction in cultivation of vegetables and/or much greater issue of seed bought wholesale should be made. Every village should have a communal orchard giving fruit which can be issued by the headmen. Isolated fruit trees are generally untended and give fruit of poor quality and small quantity. It is unusual, for example, to see a plantation of good paw-paw trees or a well tended banana grove or even a well-grown single tree anywhere in native villages. The soils and climates in the various zones are suitable to various kinds of fruit-bearing trees and shrubs and it should be possible to grow avocado, grenadilla, paw-paw, mango, guava, cashew nut, anonaceous fruits to give a supply of vitamins and other necessary food factors at various times of the year. A start should be made with communal orchards in the villages of Native Authorities.

(*d*) It is important that many areas which suffer in most years from acute shortage of food should have numerous demonstrations of how to grow, harvest and store all root crops.

(*e*) Most natural waters in Nyasaland have a very low soluble matter content, say an average of 20 parts per million. This means a very low supply of lime, iodine, etc. The impure " salt " which is made and sold locally contains a number of the necessary minerals. The industry should be encouraged instead of being allowed to languish.

E. A REVIEW OF THE CONSEQUENCES WHICH IMPROVEMENTS IN NUTRITION MAY HAVE UPON THE ECONOMY OF THE DEPENDENCY.

It is to be anticipated that improvements in the nutrition of the people will result in better health, more especially if, at the same time, the efforts now being made to rid the populace of helminthic diseases and to improve their sanitary environment are continued with patience and persistence.

Alterations in the existing methods of infant feeding and a proper appreciation of the needs of childhood would result in a reduction of the infant and child mortality.

With an increasing population in possession of better health and working ability there would be an increased output of economic crops and a greater demand for foodstuffs of all types, including tea and animal products. The ability of the country to support a larger population will depend principally on the efforts of the Agricultural Department to cope with such problems as soil erosion, shifting cultivation, economic crops, etc., and on the universal acceptance of instruction on sanitation, agriculture and animal husbandry. An educated population would be more responsive to such instruction.

Increased production of cash crops and animal products, more particularly if associated with a rise in prices, would bring more money into circulation ; this in turn would stimulate a demand for better housing and more education. The latter would create a demand for improved domestic conditions which could be provided only by women with domestic science training.

A larger, healthier, wealthier and better educated population would make increased demands for imported goods and this in turn would be of benefit to industrial countries exporting manufactured articles.

Finally, the problem of the under-nourished, disease-ridden African will not be solved merely by improving his diet. The other factors involved are of equal importance and this aspect of the problem must not be overlooked. Existing conditions can be improved only by the willing and efficient co-operation of all members—European and African—of the various departments of Government.

APPENDIX I.

QUESTIONAIRE SENT TO DISTRICT COMMISSIONERS.

1. What tribes are included in your district?
2. Are any of the tribes pastoral?
3. What is the staple food-stuff of each tribe?
4. Does the staple food-stuff vary in each case with the season of the year; or is it in part or entirely determined by the nature of the soil?
5. Are meat, fish or milk consumed regularly by any tribe or portion of a tribe?
6. Are there any "tabus" in connection with food amongst your people?
7. Is there any period of the normal year when it is difficult for your people to obtain sufficient food?
8. Do your people usually harvest sufficient food-crops to carry them over the period between crops?
9. What food-stuffs are relied upon in time of scarcity?
10. Is the variety or quantity of food grown dependent on the availability of man labour; what is the average acreage cultivated for production of food-crops by the average family, and what quantity of food-stuffs is obtained from this acreage?
11. Do natives in your district sell food for money in order to obtain other requirements? If so
12. Does this practice result in food shortage?
13. Does any bartering of food between villages or between tribe and tribe take place?
14. Is the growing of cash crops such as cotton and tobacco ever in competition with the growing of food crops to the detriment of the latter?
15. Is the cultivation individual or communal?
16. Is any form of rotation of crops used in the cultivation of food crops?
17. Is any form of manuring carried out?
18. Is the soil in your area suitable for growing vegetables, e.g. tomatoes, lettuce, spinach? If so
19. Are these vegetables grown for home consumption?
20. What fruit trees are grown by the natives of your area, and does fruit, wild or cultivated, in its season, form part of the normal dietary?
21. Do you know of any cultivated plants whose roots or leaves are used for relishes?
22. Are such relishes used fresh or dried out?

APPENDIX II.

QUESTIONNAIRE SENT TO MISSIONS AND TO SELECTED EDUCATED AFRICANS.

1. How many meals per day are taken and what quantities are consumed?
2. At what times are the meals eaten?
3. What is the principal food-stuff?
4. Does the principal food-stuff vary according to the season?
5. In what form is the staple food eaten?
6. How is is cooked?
7. What relishes are consumed? Give their names?
8. Is meat, fish or milk consumed? If so in what quantities?
9. Are breast-fed infants given additional food. If so what is its nature?
10. Do pregnant or nursing women consume additional or different food, while they are pregnant or nursing?
11. Is there any period of the year during which there is difficulty in obtaining sufficient food?
12. Is it usual in your area for families or individuals to have certain "tabus" as regards food?
13. Do the natives in your area consume any of the European vegetables, e.g., tomatoes, spinach, lettuce, etc.?
14. Is beer consumed regularly, or only on certain occasions or at certain intervals
15. Is more beer drunk in times of food scarcity than in times of plenty?
16. Is common salt a usual ingredient of the dietary?
17. How is salt obtained?
18. What are the "feeding customs" in connection with infants from birth up to say two years of age?
19. In times of food shortage do adult males or females or children have the first claim on the available food supply?

APPENDIX III.

QUESTIONNAIRE SENT TO AGRICULTURAL OFFICERS AND FORESTRY OFFICERS.

1. Do you consider that the kind of staple food used is in part or entirely determined by the nature of the soil?
2. What is the average acreage cultivated for the production of food-crops by the average family?
3. What quantity of the particular food-crop is obtained from this acreage?
4. Is the cultivation individual or communal?
5. Is it your experience or opinion that a native family could produce a more adequate food supply, without additional labour, by adopting improved agricultural methods?
6. Are groundnuts grown by the natives in your district as part of their normal food supply?
7. Is any form of rotation of crops used in the cultivation of food crops?
8. Is any form of manuring carried out?
9. Is the soil in your area suitable for growing vegetables, e.g. tomatoes, lettuce, spinach? If so
10. Are these vegetables grown for home consumption?
11. What fruit trees are grown by the natives of your area, and does fruit wild or cultivated in its season form part of the normal dietary?
12. Do you know of any cultivated plants whose roots or leaves are used for relishes?
13. Are such relishes used fresh or dried out?

APPENDIX IV.

QUESTIONNAIRE SENT TO MEDICAL OFFICERS.

1. How many meals per day are taken and what quantities are consumed ?
2. At what times are the meals eaten ?
3. What is the principal food-stuff ?
4. Does the principal food-stuff vary according to the season ?
5. In what form is the staple food eaten ?
6. How is it cooked ?
7. Is meat, fish, or milk consumed ? If so in what quantities ?
8. Are breast-fed infants given additional food. If so what is its nature ?
9. Do pregnant or nursing women consume additional or different food, while they are pregnant or nursing ?
10. Do the natives in your area consume any of the European vegetables, e.g., tomatoes, spinach, lettuce, etc. ?
11. Is beer consumed regularly, or only on certain occasions or at certain seasons ?
12. Is common salt a usual ingredient of the dietary ?
13. How is salt obtained ?
14. What are the "feeding customs" in connection with infants from birth up to say two years of age ?
15. To what extent do deficiency diseases occur in your district ? Can you give any evidence of their being seasonal ?
16. What particular ingredients are lacking in the dietary of the natives of your district ?
17. Can you offer any practical suggestions for improving the nutritive value of native dietaries ?

APPENDIX V.

CENTRAL PRISON, 1922.

DIETARY FOR LONG TERM PRISONERS.

	Maize or Millet meal lbs.	Rice lbs.	Fish lbs.	Peas or Beans lbs.	Ground-nuts lbs.	Green vege-tables ozs.	Salt ozs.	Fruit
Monday	—	1	—	½	—	—	½	when available
Tuesday	1½	—	—	—	¼	12	,,	
Wednesday	—	1	—	½	—	—	,,	
Thursday	1½	—	½	—	¼	12	,,	
Friday	—	1	—	½	—	—	,,	
Saturday	1½	—	—	—	¼	12	,,	
Sunday	1½	—	½	½	¼	12	,,	

When no fish was available 8 ozs. meat only per week was given. Owing to a scarcity of fresh vegetables for a time, 8 ozs. only could be given; at other times more than 12 ozs. per man was issued when vegetables were abundant.

Fruit consisted of bananas and mangoes of which in their season there were large supplies.

Subsequently, the above scale was altered and the following diet substituted.

	Maize or Millet flour		Fish	Peas, beans or Ground nuts	Vegeta-bles	Salt
Monday	1½ lb.	Or 1 lb. Rice daily	½ lb.	½ lb.	½ lb.	½ oz.
Tuesday	,,		—	½ lb.	½ lb.	,,
Wednesday	,,		½ lb.	—	—	,,
Thursday	,,		—	½ lb.	½ lb.	,,
Friday	,,		½ lb.	—	—	,,
Saturday	,,		—	½ lb.	½ lb.	,,
Sunday	,,		½ lb.	—	—	,,

1 lb. of meat may be substituted for 2 lbs. fish when the latter is unobtainable. Fruit when available may be given as an extra.

The quantities stated in the foregoing diets are of issue prior to being cooked in the usual fashion. The salt may be used for cooking the diets or issued separately at the option of prisoners.

APPENDIX VI.

No. I—HOSPITAL DIETARY.

	Maize flour (*ufa*) lbs.	Beans ozs.	Green vegetables ozs.	Ground nuts ozs.	Rice lbs.	Tomatoes ozs.	Meat lbs.
Monday	1¼	8	—	—	—	—	—
Tuesday	1¼	4	8	4	—	—	—
Wednesday	—	4	—	—	1	4	½
Thursday	1¼	8	—	—	—	—	—
Friday	¾	4	8	4	½	—	—
Saturday	1¼	8	—	—	—	—	—
Sunday	—	—	—	—	1	4	1

Salt—sufficient for requirements.

Fruit—mangoes, bananas and lemons provided when in season.

Where or when meat is not obtainable, a larger issue of fish is made.

APPENDIX VII.

Daily dietary:

A meal in the early morning is advised. This should consist of:—

Bread	2 oz.
Ghee	½ oz.
Tea	¼ oz.
Milk	2 oz.
Sugar	1 oz.
Eggs	2, three mornings of the week.

For the other two meals of the day, the following items in the quantities stated provide a daily average of 3,200 calories approximately, 10% should therefore be added to allow for waste and loss in cooking.

Monday	20 ozs. *ufa*, 4 oz. beans, 4 oz. groundnuts, 4 oz. fish.
Tuesday	20 ozs. *ufa*, 3 oz. beans, 4 oz. tomatoes, 8 oz. meat.
Wednesday	18 oz. rice, 3 oz. groundnuts, 8 oz. green "relish," 4 oz. fish.
Thursday	10 oz. *ufa*, 10 oz. rice, 3 oz. soya beans, 4 oz. tomatoes, 4 oz. groundnuts.
Friday	20 oz. *ufa*, 8 oz. sweet potatoes, 2 oz. beans, 2 oz. groundnuts, 8 oz. meat.
Saturday	16 oz. rice, 4 oz. groundnuts, 4 oz. beans, 4 oz. meat.
Sunday	20 oz. *ufa*, 4 oz. soya beans. 8 oz. green "relish," 4 oz. meat.

The calorific value of fruit to the extent of 2d. worth per week has not been considered, with this sum it is possible to purchase sufficient for requirements. The cost of the other items amounts to 3s. 1d., to this must be added 10% for wastage and cooking, bringing the weekly budget per head to 3s. 4d.; an allowance of ½d. per week must be included for salt.

The figures employed in calculating food values have been obtained from Memorandum XIII issued by the International Institute of African Languages and Cultures. As only a few of the foodstuffs of this country have been analysed, it was necessary to utilise values shown for similar items in adjacent territories though these may or may not be applicable.

APPENDIX VIII.

EDIBLE WILD PLANTS IN NYASALAND.

The number of wild fruits and vegetables which are found in Nyasaland is very large, but apart from those which come from trees, only a small number is known to the writer. These wild products vary widely as regards palatability and it has been found difficult to draw the line between those which are just worth eating and those which are only gathered in times of real shortage of food. Very few wild fruits compare in importance with cultivated bananas, mangoes etc., in the normal dietary of the people.

Brief notes are appended regarding leaves, which are eaten as relishes.

This list is based partly on experience but mainly on notes collected by the Conservator of Forests. They have been corrected by two competent natives.

FRUITS OF WILD TREES AND SHRUBS.

In a class by itself is

1. *Uapaca Kirkiana Muel Arg.* (Msuku).

The fruit is plentiful and widely consumed by man and animals alike. Carnivores are reported to eat it, which suggests that it fulfils some specific want; it is not eaten by Europeans as a rule.

OTHER PALATABLE FRUITS ARE:

2. *Annona chrysophlla* Boj, wild custard apple.
3. *Ficus*, several spp, wild figs.
4. *Garcinia buchanannii* Bak., very acid but juicy.
5. *Parinari mobola* Oliv., a wild plum.
6. *Rubus* (8 species), wild blackberry.
7. *Syzygium cordatum* Hochst ex Sond. Small sweet fruits.
8. *S. guineense* (Willd) D.C.
9. *S. mumbwaense Greenway.*
10. *Vitex cuneata* Thonn., a sweet wild plum. Also other species of *Vitex.*
11. *Ximenia caffra* Sond. Excellent sweet fruit.
12. *Ximenia americana* L. ,, ., ,,
13. *Zizyphus jujuba Lam.* The Masao. The fruit is pulped and fermented and consumed in large quantities in S. Nyasaland both as intoxicant and as a food.

OTHER FRUITS: *including less palatable kinds.*

AMPELIDACEAE.

14. *Cissus rubiginosa.* (Welw) Planch. and other C. spp.
15. *Rhoicissus erythrodes* Planch.
16. *R. revoilii* Planch.

ANACARDIACEAE.

17. *Lannea edulis* (Sond) Engl.
18. *Rhus sp. v.*, small fruits, sweet.
19. *Sclerocarya caffra Sond.* Seed kernels eaten in times of shortage.

ANNONACEAE.

20. *Artabotrys stolzii* Diels. Rather unpalatable
21. *Popowia djurensis* Schweinf. Rather unpalatable

APOCYNACEAE.

22. *Landolphia spp.* Good sweet fruit.

ARALIACEAE.

23. *Cussonia sp.* Rather unpalatable.

BOMBACACEAE.

24. *Adansonia digitata* Ulbrich. Pith surrounding seeds has lemon flavour.

CAESALPINIACEAE.

25. *Bauhinia petersiana* Bolle. Beans pounded and eaten in times of famine.
26. *B. thonningii Schum.* have value as cattle fodder.
27. *Cassia mimosoides* L.
28. *C. petersiana* Bolle. Pods pounded and soaked to yield sugar.
29. *Tamarindus indica* Tourn. ex L. Pulp of pods has strong flavour of lemon.

CELASTRACEAE.

30. *Elaeodendron sp.* Unpalatable.

EBENACEAE.

31. *Diospyros kirkii* Hiern. Sweet fruits.
32. *D. mespiliformis.* Hochst ,, ,,

EUPHORBIACEAE.

33. *Antidesma venosum* Tul. Small fruits, sweet.
34. *Bridelia ferruginea Benth.* ,, ,, ,,
35. *B. micrantha Baill* ,, ,, ,,
36. *Macarnga kilimandscharica* Pax.
37. *Uapaca nitida* Muel Arg. Palatable.
38. *U. sansibarica* Muell Arg. ,,

FLACOURTIACEAE.

39. *Caloncoba welwitschii* (Oliv.) Gilg.
40. *Flacourtia kirkii* B. Davy. Sweet fruits.
41. *Hirtiuscula Oliv.* ,, ,,
42. Oncoba spinosa. Forsk.

LOGANIACEAE.

43. *Strychnos dysophylla* Benth. Pulp around seeds is sweet.
44. *S. spinosa* Lam. Pulp around seeds is sweet.

MALVACEAE.

45. *Thespesia rogersii* Soland. ex Corr. Seeds eaten—palatable.

MELIACEAE.

46. *Ekebergia meyeri Presl.*

MIMOSACEAE.

47. *Acacia.* Some of the pods can be cooked with other food in times of famine, *e. g. A. Albida Del.* Pods have a fodder value.

48. *Parkia filicoidea* Welw ex Oliv. Not palatable.

MORACEAE.

49. *Treculia africana* Decne. ex Trec. Seeds roasted are good eating.

MYRSINACEAE.

50. *Embelia welwitschii* K. Schum.

OCHNACEAE.

51. *Ochna hoepfneri and Gilg.* Unpalatable.

PALMACEAE.

52. *Borassus aethiopum* Mart. Pulpy fruit, not very palatable.
53 *Hyphaene crinita* Gaertn. Husks chewed dry.

PAPILIONACEAE.

54. *Cordyla africana* Lour. Unpalatable.
55. *Mucuna stans* Welw. ex Bak. Beans cooked as a famine food.

RHAMNACEAE.

56. *Zizyphus mucronata* Willd. Unpalatable.

ROSACEAE.

57. *Parinari holstii* Engl.
58. *Pygeum africanum* Hook. f.

RUBIACEAE.

59. *Canthium crassum,* Hiern. Palatable.
60. *Canthium spp.*
61. *Gardenia manganjae* Hiern. Unpalatable.
62. *Mussaenda arcuata* Poir.
63. *Randia sp.* Small fruits, unpalatable.
64. *Tricalysia andongensis* Hiern.
65. *Tricalysia mucronulata* K. Schum.
66. *Vangueria tomentosa* Hochst. Moderately palatable.

SAPINDACEAE.

67. *Allophylus africanus* P. de Beauv.
68. *Pappea capensis var radlkoferi* Schinz.
69. *P. ugandensis* E. G. Baker.
70. *P. fulva* Conrath.

SAPOTACEAE

71. *Chrysophyllum natalense* Sond.
72. *Mimusops spp.* Not very palatable.
73. *Pachystela brevipes* Engl.

STERCULIACEAE.

74. *Cola clavata* Mast. Soft fruits, not Cola nuts.

TILIACEAE.

75. *Grewia spp.* Small fruits, not palatable.

EDIBLE ROOTS.

Coleus dazo Chev, Perret. Palatable raw or cooked.
Mpama (vern.) not identified. Large roots. Palatable.
Elephantorrhiza. Eaten only in times of famine.
Tecca involucrata Schum. Eaten only in times of famine.
Tiliacoria funifera (Meirs) Oliv. Eaten only in times of famine.
Triumphetta tomentosa Bojer. Eaten only in times of famine.

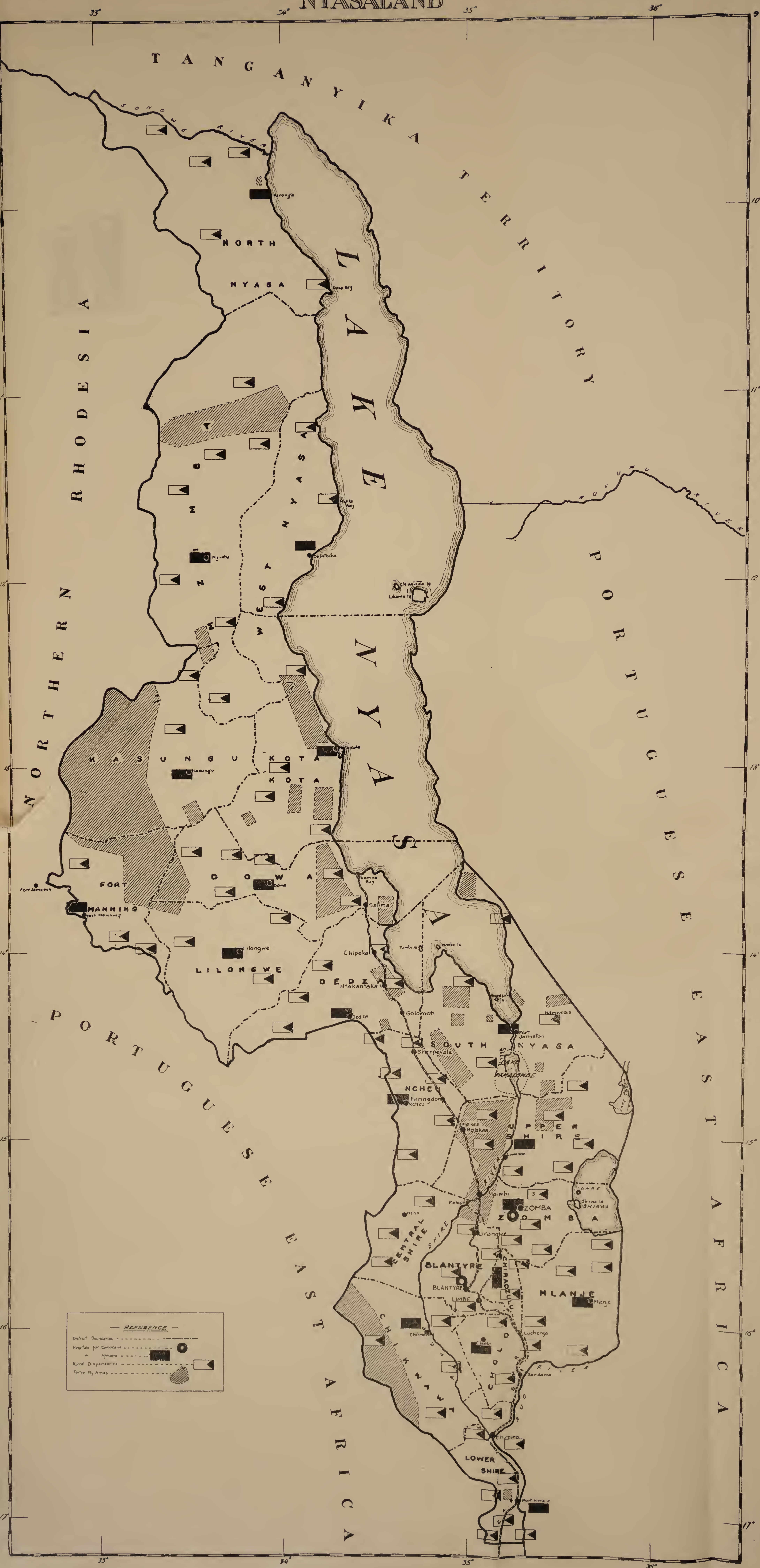
In addition there are many herbaceous plants and climbers whose roots are eaten in times of hunger only. The identify of these is not known to the writer.

EDIBLE LEAVES.

Vernacular names only are known for thirty-five different kinds of wild plants which yield a kind of spinach eaten as a relish with staple foods.

Some trees and shrubs yield edible leaves but some of these are consumed for ritual purposes rather than as food.

NYASALAND



33°
34°
35°
36°
9
10
11
12
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14
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16
17
TANGANYIKA TERRITORY
SONGWE RIVER
Karonga
NORTH NYASA
Deep Bay
LAKE NYASA
NORTHERN RHODESIA
M'BWA
WEST NYASA
Nkata Bay
Chinteche
Mzimba
Chisamulu Is
Likoma Is
RUVUMA RIVER
PORTUGUESE EAST AFRICA
KASUNGU
Kasungu
KOTA KOTA
Kota Kota
DOWA
Dowa
Domira Bay
Salima
FORT MANNING
Fort Manning
Fort Jameson
Lilongwe
LILONGWE
Chipoka
Tumbi Is
Ntakataka
DEDZA
Dedza
Golomoti
Fort Johnston
SOUTH NYASA
Sharpevale
LAKE PAMALOMBE
NCHEU
Faringdon
Ncheu
Balaka
UPPER SHIRE
Liwonde
LAKE SHIRWA
Shirwa Is
Mpimbi
Matope
Neno
ZOMBA
Zomba
Chiradzulu
Liranji
CENTRAL SHIRE
SHIRE RIVER
BLANTYRE
Blantyre
LIMBE
MLANJE
Mlanje
Chikwawa
CHIKWAWA
CHOLO
Cholo
Luchenza
RUO RIVER
Sandama
Chiromo
LOWER SHIRE
Port Herald
— REFERENCE —
District Boundaries
Hospitals for Europeans
" Africans
Rural Dispensaries
Tsetse Fly Areas